



Strategic Environmental Research and Development Program (SERDP)

Rotary Kiln Gasification of Solid Waste for Base Camps

Stephen D. Cosper

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Rotary Kiln Gasification of Solid Waste for Base Camps

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SERDP Project Number WP-2211



U.S. Army Engineer Research and Development Center Construction Engineering Research Laboratory 2902 Newmark Drive, Champaign, IL 61822

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Abstract

Objectives

The objective of this project was to develop a battalion-scale waste-to-energy (WTE) system based on the principle of gasification. More specifically, the goal the WTE system was to convert 1 to 3 tons per day of mixed wastes to energy, with minimal pre-processing, and with a net-positive energy output (net of parasitic losses). Also, the size of the system was to be limited to two, 20-ft shipping containers.

Technical Approach

The research team took the approach of developing an entire working prototype, rather than analyzing a portion of the waste gasification process. The rotary kiln WTE system was conceived to address the Statement of Need (SON) criteria, with the following design principles:

- accept and process mixed, unsorted municipal waste materials
- minimize process energy required through careful heat management and use of hydraulics
- integrate into contingency utility systems by using standard diesel generators.

The main gasification reactor is a novel design, based on an updraft gasifier, but rotating with new techniques for introducing waste, and removing syngas. This system was tested on multiple waste mixtures, representative of reported, in-theater waste composition.

Results

The rotary gasification system was successfully developed and testing. The syngas produced was energy rich, mirroring commercial liquid fuels in composition. The resulting ash test non-hazardous for heavy metals. Perhaps most importantly, researchers showed that waste could be consumed with a net-positive energy output.

Benefits

If this technology were to be further developed, demonstrated, and fielded, it could solve the problem of contingency waste disposal, eliminating burn pits, or the need for hauling outside the perimeter of the camp. Additionally, this system outputs net-positive energy, tens of kilowatts at the target scale, thereby displacing a modest fuel requirement.

List of Acronyms

Term Definition

AC alternating current
AFT Auxiliary Fuel Tank

AICHE American Institute of Chemical Engineers
ASME American Society of Mechanical Engineers
BGGE Billion Gallons of Gasoline Equivalent

BHP brake horsepower
BTU British Thermal Unit
CB Contingency Bases

CCG Certified Calibration Gas (Standard)

CEA Chemical Equilibrium with Applications (NASA computer program)

CERL Construction Engineering Research Laboratory
CEST Center for Environmental Science and Technology

CF Cubic Feet

CFD Computational Fluid Dynamics
CFR Code of the Federal Regulations
CGMA Cylinder Gas Metering Apparatus

CI ICE Compression Ignition (Diesel) Internal Combustion Engines

CO Carbon Monoxide

CONUS Continental United States

CSIRO Australia's Commonwealth Scientific and Industrial Research Organization

DC Direct Current

DOD US Department of Defense
DOE US Department of Energy
DPM Discrete Phase Model
ECM Electronic Control Module

EG Ethylene Glycol

EPA Environmental Protection Agency

ERDC Engineer Research and Development Center

FC Fixed Carbon

FID Flame Ionization Detector
FPD Flame Photometric Detector

GC Gas Chromatograph
GPM Gallons Per Minute
HCL hydrogen chloride

HDPE High-Density Polyethylene
HHV Higher Heating Value

HP Horsepower HV Hand Valve

HVAC Heating, Ventilating, and Air-Conditioning

I/C Internal combustion

IFPD Indirect Flaming Pyrolysis Downdraft
IIFPRG Indirect Flaming Pyrolysis Downdraft

Term Definition

IPR In Progress Review
LHV Lower Heating Value

METC Morgantown Energy Technology Center

MFT Main Fuel Tank

MGAS METC Gasifier Advanced Simulation

MIG Gas Metal Arc Welding MSW Municipal Solid Waste

NASA National Aeronautics and Space Administration

NITS National Technical Information Services

NOX Generic term for mono-nitrogen oxides NO and NO₂ (nitric oxide and nitrogen dioxide])

NSPS New Source Performance Standards

NYDEC New York State Department of Environmental Conservation

OMB Office of Management and Budget

OS Oil Separator

OSB Oriented Strand Board

PDB Positive Displacement Blower

PG Propylene Glycol

PID Proportional Integral Derivative
PLC Programmable Logic Controller

PM particulate matter
PRV pressure reducing valve
psi Pounds per Square Inch

PSR Polisher

PVC Polyvinyl Chloride

R&D research and development

RANS Reynolds Averaged Navier- Stokes (RANS)

RDECOM Research, Development, and Engineering Command

RF Ram Feeder RH Reheater

RPC Relative Power Capacity
RPM revolutions per minute

SAR Same As Report

SBR Sequencing Batch Reactor

SC Scrubber

SCADA Supervisory Control And Data Acquisition

SCF Standard Cubic Feet

SCFH standard cubic feet per hour SCFM standard cubic feet per minute

SEP Separator

SERDP Strategic Environmental Research and Development Program

SLHV Specific Low Heating Value (SLHV)

SON Statement of Need SOX Sulfur Oxides

SRI Statistical Research, Inc.

Term Definition

TCD Thermal Conductivity Detector
TIG Gas Tungsten Arc Welding

TR Technical Report
UHP Ultra-High Purity
UPH Ultra-High Purity
US United States

USA United States of America
USACE US Army Corps of Engineers

USEPA US Environmental Protection Agency

USMA US Military Academy

VAC Volt AC VDC volt DC

VM Volatile Matter
WS Water Separator
WTE Waste-to-Energy

1. Introduction

1.1 Objectives

The statement of need (SON) to which this project responds, calls for a battalion-scale waste-to-energy (WTE) system based on the principle of gasification. The goal is to convert 1 to 3 tons per day of mixed wastes to energy, with minimal pre-processing, and with a net-positive energy output (net of parasitic losses). Also, the size of the system was required to be limited to two, 20-ft shipping containers.

While the SON states to not focus on engineering an entire WTE system, the research team believed that a holistic approach was really necessary to achieve the performance desired, rather than trying to make incremental improvements to existing technology.

The rotary kiln WTE system was conceived to address the SON criteria, with the following design principles:

- accept and process mixed, unsorted municipal waste materials
- minimize process energy required through careful heat management and use of hydraulics
- integrate into contingency utility systems by using standard diesel generators.

1.2 Core Design Objectives

The Inclined Indirect Flaming Pyrolysis Rotary Gasifier (IIFPRG) was invented and developed by researchers at SUNY Cobleskill in coordination with USACE-ERDC-CERL, Benét Laboratory, and USEPA. The intent was to develop a simple and reliable WTE system that could actually be used by the military, at forward operating bases, thereby meeting the challenge posed by the SON.

System design focused on the following core design objectives:

- 1. Ensure system safety as the highest priority.
- 2. Develop a portable, small, simple, and reliable 60 kW trailer-mounted system that can be military containerized in the future.
- 3. Process a wide variety of waste types with minimal or no feedstock preparation.
- 4. Handle feedstock only once. Avoid equipment prone to blockages such as multiple conveyors, storage bins, grinders, etc.
- 5. Dry wet wastes to less than 50% moisture content by squeezing under high compressive stress.
- 6. Use creative thermodynamic concepts to move heat where needed and recover lost heat to enable the processing of excessively wet feedstock.
- 7. Inert items such as glass, metals, soil, rocks, etc., must pass through the gasifier easily and discharge with the ash.

2. General Design

2.1 Introduction

The process developed by SUNY Cobleskill and research partners uses a unique form gasification to convert any flammable solid waste into to a synthetic fuel gas (syngas). A 60 kW diesel engine-driven generator operates in dual-fuel mode to generate electricity. The engine operates primarily on gaseous synthetic fuel created from wastes with supplemental liquid fuel.

The prototype system is mounted on two trailers and is fully portable. The system currently processes up to 1.25 tons of wet waste per day and generates between 50 and 60 kW of usable electrical power. Research focuses on how to reliably process mixed stream wastes with minimal requirements for sorting.

2.2 Technology for the Project

The technology uses a simple and robust means of precision thermodynamic energy management to process dripping wet waste into thermal and electrical energy. The energy to sustain the process is provided by the feedstock. SERDP funds were used to further develop and test the concept of IIFPRG.

The IIFPRG is a hybrid rotary gasifier that combines the properties of cross draft, updraft, downdraft, and indirect rotary gasification into one reactor. The thermal energy to sustain thermochemical reactions is provided by the following sources:

- 1. The combustion of fixed carbon at 1900 to 2100 °F within the reactor at the downhill end.
- 2. Combustion of a small portion of syngas to raise the temperature of engine exhaust.
- 3. Indirect thermal energy transfer from heated engine exhaust to process equipment.
- 4. Exothermic chemical reactions, primarily combustion and water shift reactions.

Sufficient thermal energy exists to process dripping wet wastes.

2.3 Feedstock Preparation

A significant advantage of the IIFPRG system is the ability to process as-received dripping wet wastes. The system is best suited for mixed homogenous wastes. Grinding or shredding of feedstock is required only if the waste will not physically fit into the feed system. A simple ram arrangement pushes feedstock into the gasifier. The ram has sufficient force to shear and break larger materials to allow passage through the feed system. Excessive amounts of fine particles are not a process problem and separation by screening is not required.

Small inert items, such as metals, glass, stones, soils, nails, etc., do not require separation. These items are introduced into the gasifier with the feedstock and discharge with the ash. Combustion temperatures in the downhill end of the gasifier are between 1900 and 2100 °F. The formation of slag may occur as ash and inert items are exposed to extreme temperatures before discharge. Fine bottom ash freely discharges during operation from the downhill end of the gasifier. Clinkers and

slag periodically discharge through an ash door. Large inert items such as structural steel, appliances, drywall, etc. should be separated from the feedstock before processing.

The system is designed to handle dripping wet wastes. Separation and pre-drying of waste is not required. The energy to process excessively wet waste is provided by the feedstock. Additional feedstock must be processed to compensate for excessive moisture. Although the system can process dripping wet wastes, care should be taken to keep feedstock as dry as possible before processing. Wastes should be protected from excessive moisture absorption during heavy weather.

2.4 Dewatering by Super-Compression

The IIFPRG system is designed to process dripping wet wastes, with moisture contents greater than 80% on a wet basis (20% solids / 80% liquids). The super-compression dewatering ram mechanically squeezes dripping wet feedstock, to both densify and remove excessive free liquids as feedstock enters the gasifier. Sufficient bulk chunks must exist in the feedstock to provide an active surface for the dewatering ram to push against. Slurries must be mixed with bulk for dewatering to occur.

The design target of the ram feeder is to lower the average moisture content of the feedstock entering the gasifier to less than 50%. The resulting liquids are captured and stored. Waste liquids are later disposed by injecting into the gasifier when processing excessively dry feedstock, such as wastes high in dry paper and cardboard content.

2.5 Thermodynamic Process Design Approach

The IIFPRG does numerous functions in one reactor vessel as illustrated in Figure 2-1.

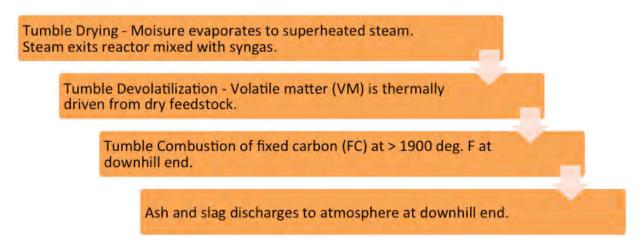


Figure 2-1. Process Design of IIFPRG.

2.5.1 Tumble Reactions

The entire gasifier vessel rotates, allowing raw and partially reacted feedstock to freely tumble within the reactor. Tumbling action allows continual exposure to drying, de-volatilization, and

combustion at different temperature zones within the reactor. The rotary action also helps ash and slag to freely discharge from the downhill end.

2.5.2 Proximate Analysis of Feedstock

The performance of the gasifier is based on the proximate analysis of the feedstock. Feedstock moisture varies dramatically, requiring the evaluation on a dry basis. Feedstock must be categorized on a moisture free percent mass basis as follows:

- 1. Higher Heating Value (HHV) of the composite feedstock
- 2. Percent volatile matter (VM)
- 3. Percent fixed carbon (FC)
- 4. Percent ash.

2.5.3 Simplified Thermochemical Reactions Using Proximate Analysis

The IIFPRG operates on the following core concepts:

- 1. All feedstock is first dried when entering the gasifier. Moisture is flashed to superheated steam. Steam exits the gasifier with the syngas.
- 2. Steam does not contact or pass through the burning char bed, preventing the highly endothermic water-gas reaction $(H20 + C \rightarrow CO + H_2)$ from occurring.
- 3. The slightly exothermic water shift reaction $(H_2O + CO -> CO_2 + H_2)$ does not freely occur within the gasifier due to the lack of a catalyst.
- 4. Dry feedstock is devolatilized using heat. All gaseous VM is driven out of the feedstock, leaving carbon rich FC.
- 5. Thermal heat within the gasifier is provided by burning FC at 2100 °F with air that enters the reactor on the far downhill end. Additional heat for drying is provided to the rotating gasifier shell using energy from the diesel exhaust.
- 6. FC burns fully to ash. Ash discharges from the gasifier at 1900 to 2100 °F.

2.5.4 IIFPRG System Thermodynamics

The operating concept and related thermodynamics of the IIFPRG system are summarized as follows:

- 1. Bagged and bulk feedstocks are stored in a staging area near the gasifier.
- 2. Super-compression ram feeder.
 - a. Compression dewatering reduces moisture content from dripping wet to < 50% moisture (wet basis).
 - b. Feedstock densifies under heat and pressure into a briquette when entering the gasifier.
 - c. Compressed feedstock forms an airlock seal.
- 3. Densified dewatered feedstock enters the gasifier.
 - a. Feedstock enters a few inches uphill of the > 1900 °F burning char bed.
 - b. Densified feedstock fully dries and breaks apart.
 - c. Moisture vaporizes to superheated steam using indirect heat from diesel exhaust.
 - (1) Liquid heats from ambient to boiling.

- (2) Latent heat of vaporization transforms liquid water into vapor.
- (3) Steam is superheated to the gasifier exit temperature.
- 4. Feedstock heats from ambient to volatilization temperature.
- 5. Feedstock flash gasifies and devolatilizes into FC as it approaches the burning FC zone. Feedstock devolatilizes into carbon monoxide rich syngas.
- 6. FC combusts with air at 14,093 BTU/lb. Combustion temperature is between 1900 to 2100 °F at 1.0 equivalence ratio at the downhill end of the gasifier. Ash and inert materials are exposed to high combustion temperatures to thermally decompose all dioxins and furans.
- 7. The combustion products from burning FC (carbon dioxide and nitrogen) mix with exiting syngas and steam at 500 to 700 °F. These inert gases dilute the energy level of the syngas.
- 8. Syngas enters the super-heater (indirect exposure to the burning char layer) where the gas mixture is heated to 2100 °F (1150 °C) using direct heat transfer from diesel exhaust heated in the afterburner. This helps to thermally crack larger molecular weight materials.
- 9. Syngas enters the oil filled quencher-scrubber. This scrubber uses waste motor pool lubricants as the scrubbing liquid. Syngas is cooled from 2100 to 210 °F in less than 1 millisecond to minimize dioxin and furan formation.
- 10. High dewpoint tars and heavy particulates are removed in the oil scrubber. Syngas at 210 °F exits the quencher-scrubber and enters the condenser. The condenser cools the gas to within 20 °F of the ambient temperature. All remaining steam is condensed to liquid condensate.
- 11. Hydrogen-rich syngas enters the oil filled quencher-scrubber. This scrubber uses waste motor pool lubricants as the scrubbing liquid. Syngas is cooled from 2100 to 210 °F in less than 1 millisecond to minimize dioxin and furan formation.
- 12. High dewpoint tars and heavy particulates are removed in the oil scrubber. Syngas at 210 °F exits the quencher-scrubber and enters the condenser. The condenser cools the gas to within 20 °F of the ambient temperature. All remaining steam is condensed to liquid condensate. The majority of steam in the syngas reacts to hydrogen in the water shift reactor, minimizing the formation of condensate downstream of the condenser. Any condensate that forms is removed from the syngas using a cyclonic separator.
- 13. The flow of scrubbed and filtered syngas is fed both into the diesel engine and into the afterburner. Syngas is fed into the engine intake air stream. The engine speed increases with the presence of gaseous fuel and the governor reduces the injection rate of liquid fuel.
- 14. Syngas enters the reheater, where it is heated to about 20 °F above the dewpoint.
- 15. Syngas enters the fluid bed sorbent absorber, where various dry sorbents are used for SOx and heavy metals removal. Sorbents include a mixture of lime (CaO and hydrated), sodium bicarbonate, trona, and activated carbon. Sorbents are replaced based on experimentation. Syngas is filtered using Nomex cartridge filters at the outlet of the dry fluid bed scrubber.
- 16. The flow of scrubbed and filtered syngas is fed both into the diesel engine and into the afterburner. Syngas is fed into the engine intake air stream. The engine speed increases with the presence of gaseous fuel and the governor reduces the injection rate of liquid fuel.
- 17. Diesel exhaust, with about 11% excess oxygen enters the afterburner. Syngas mixes with the diesel exhaust and combusts using the excess oxygen in the exhaust stream. The afterburner raises the diesel exhaust temperature from 900 °F to 2400 °F (1316 °C). Automation limits the combustion temperature at 2400 °F to minimize NOx formation and oxygen content. All remaining CO and all dioxins are expected to be destroyed at this temperature (above 1200 °C), although this was not verified experimentally.

18. The heated diesel exhaust exits the afterburner and enters the super-heater to provide sufficient heat to crack raw syngas. Diesel exhaust at approximately 900 °F exits the super-heater and enters the indirect gasifier, where heat is transferred through the rotating gasifier shell to vaporize feedstock moisture. Diesel exhaust exits the gasifier shell to atmosphere at approximately 450 °F.

3. Indirect Flaming Pyrolysis Rotary Gasifier (IIFPRG) System Equipment Test Configuration for SERDP Mixes

3.1 General Arrangement of Complete System

The configuration of the gasification system used on SERDP mix testing was consolidated on two 7x18-ft equipment trailers. The purpose of this was to mimic the size and layout of two, 20-ft shipping containers.

Trailer #1 contained the feedstock handling system, rotary gasifier reactor, the complete syngas scrubbing system, and the master Allen Bradley automation system. Figure 3-1 shows the rotary gasifier in the center, and the waste feed bin on the right, and syngas cooling and cleanup on the left.

Trailer #2 contained a 60 kW generator driven by a John Deere 5030HF270 diesel engine (this is similar to a Tactical Quiet Generator), a 63 kW, 480 VAC, three-phase load center to electrically load the generator, a liquid fuel consumption measurement system, main hydraulic drive system components, DC power conversion system, and a local control panel for load control and data acquisition.

The equipment configuration for all testing of SERDP mixes is shown in Figure 3-2 and Figure 3-3. Full size drawings can be provided upon request. Figure 3-4 shows the main gasifier reactor and the horizontal pipe which carries hot diesel exhaust from the generator to the reactor shell.



Figure 3-1. View of Gasification Trailer #1.

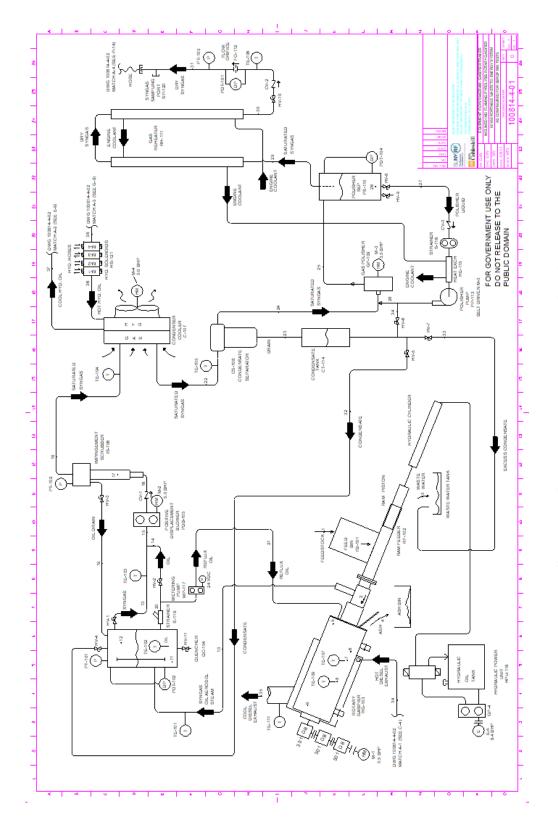


Figure 3-2. Schematic Showing Main Reactor and Gas Conditioning.

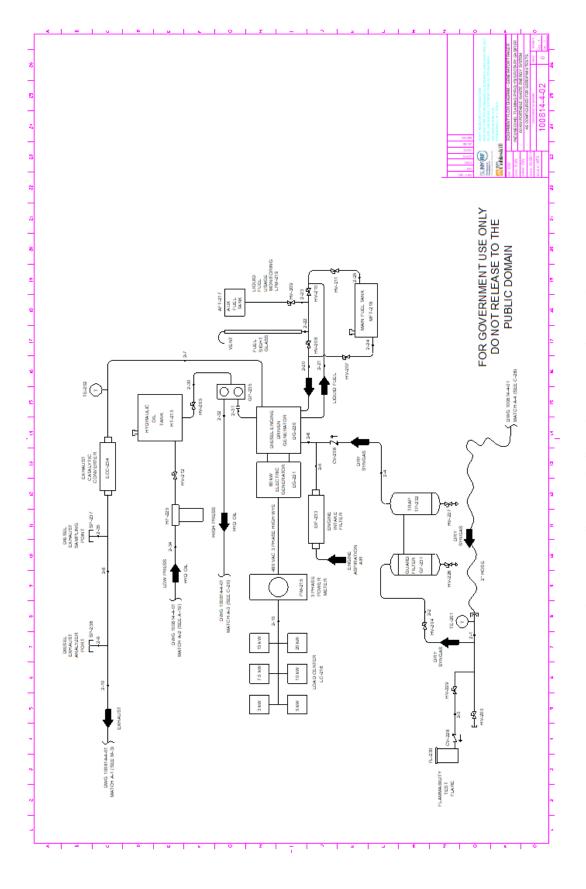


Figure 3-3. Schematic Showing Power Generation.



Figure 3-4. Gasification Trailer and Hot Diesel Exhaust Piped to the Gasifier Shell.

3.2 Process Equipment

Figure 3-2 and Figure 3-3 give the schematic layout of the entire system. These figures are labeled with each part, or "tag number." A description of each part follows in Table 3-1.

Table 3-1. Equipment and Instrument Tag List.

Tag Number	Device	Description	Function	Notes
AFT-217	Aux Fuel Tank	5 Gallon Auxiliary Diesel Fuel Tank	Refills fuel sight glass for fuel consumption measurement	Research purposes only
C-107	Condenser Cooler	Combination syngas condenser and hyd. cooler	Cools syngas to remove moisture and cools hydraulic oil	Hydraulic oil overheats (> 140 F) when attempting to raise dew point by slowing fan speed
CS-108	Condensate Separator	Liquid Separator	Removes liquids from syngas	Only required when condenser is used
CT-114	Condensate Tank	Condensate storage tank	Stores accumulating condensate	6 gallon tank, manual drain
CV-1	Check Valve	Main aspiration non-return check valve	Prevents backflow of syngas if blower stops	Swing check
CV-2	Check Valve	Main syngas non-return check valve	Flashback preventer	Swing check

Tag Number	Device	Description	Function	Notes
CV-206	Check Valve	Swing check - flapper lifts up	Prevents backflow of air into gasification system	Safety device
CV-228	Check Valve	Swing check	Prevents backflow of air into gasification system	Safety device
CV-3	Check Valve	Polisher Liquid non-return check valve	Prevents syngas from flowing thru polisher pump PP- 113	Swing check
DG-220	Generator	60 kW Diesel Engine-Driven Generator	Dual fueled on liquid diesel fuel and gaseous synthetic fuel	No bypass flare used - syngas fed to engine during startup and shut down
E-5	Gasoline Engine	Ram Feeder Drive Engine	Engine to drive separate hydraulic pump GP-4	8.4 BHP, intermittent use, hand start
ECC-234	Exhaust Catalyst	Exhaust Catalytic Converter	Burns remaining hydrocarbons in exhaust stream	Significant reduction in unburnt hydrocarbons
EG-221	Electrical Generator Head	60 kW Marelli Generator Head	Generates AC Electricity	4 Pole Synchronous Generator - Wired 480 VAC 3 phase High Wye
EIF-233	Filter	Engine Air Intake Filter	Filters engine aspiration air	
FB-101	Feed Bin	Feed Point	Feedstock handling	Holds raw feedstock
FL-230	Flammability Test Flare	6 in. diameter micro-flare	Used to test syngas flammability at startup and shut down	Research Purposes
FO-112	Flow Orifice	Syngas flow measurement orifice	Measures syngas flow to engine	1.380-in. ID Cd=0.83
GF-231	Guard Filter	Guard Filter with Polypropylene Filter Bag	2, 5, 10, 20, and 50 micron rating tested	20 and 50 micron work well
GP-109	Gas Polisher	Gas Cleaner	Removes low dew point tars and particulates from syngas	Rotary mechanical gas cleaner - virtually no particulates
GP-235	Hydraulic Pump	Constant displacement hydraulic gear pump	Provides system power	Driven by engine mechanical power take off
GP-4	Hydraulic Pump	Ram Feeder Engine-Driven Hydraulic Pump	Pump for ram feeder RF-102	-
HE-115	Heat Exchanger	Polisher liquid heat exchanger	Uses hot engine coolant to heat polisher liquid	Heat polishing liquid to avoid significant gain or loss
HF-225	Hydraulic Filter	Hydraulic return filter	Filters hydraulic oil returning to tank	10 micron

Tag Number	Device	Description	Function	Notes
HPU-118	Hydraulic Power Unit	Hydraulic power unit for ram feeder	Provides power to drive ram feeder RF- 102	Self-contained engine- driven unit
HS-121	Hydraulic Solenoids	24 volt DC (VDC) Hydraulic Solenoid Bank	Reversing, closed center	Dual Coil with manual over-rides
HT-213	Hydraulic Tank	Main Hydraulic Oil Tank	37 gallon steel oil tank	With 100 mesh suction strainer. Oil heating required when operating below 50 °F (oil foams)
HV-1	Hand Valve	Syngas Exhaust from Quencher	Maintenance valve	Ball valve
HV-10	Hand Valve	Syngas shut off valve	Maintenance valve	Ball valve
HV-11	Hand Valve	Quencher QC-104 liquid drain valve	Maintenance valve	Ball valve with plug
HV-2	Hand Valve	Scrubber liquid flow control valve	Throttles scrubber liquid to impingement scrubber IS-106	Ball valve
HV-203	Valve	Hand Valve	Syngas shut off valve	Used to bypass syngas to external flare - early testing
HV-204	Valve	Hand Valve	Syngas shut off valve	Stops flow of syngas to engine - forces flow to flammability test flare F- 230
HV-205	Valve	Hand Valve	Hydraulic suction shut off	Maintenance valve
HV-207	Valve	Hand Valve	Fuel shut off valve	Close HV-207 and HV-211 simultaneously to measure fuel usage
HV-208	Valve	Hand Valve	Fuel shut off valve	Maintenance valve
HV-209	Valve	Hand Valve	Fuel shut off valve	Normally closed - open to refill sight glass before fuel usage test
HV-210	Valve	Hand Valve	Fuel shut off valve	Maintenance valve
HV-211	Valve	Hand Valve	Fuel shut off valve	Close HV-207 and HV-211 simultaneously to measure fuel usage
HV-212	Valve	Hand Valve	Hydraulic return shut off	Maintenance valve
HV-226	Valve	Hand Valve	Drain condensate from guard filter	Liquid placed in QC-104
HV-227	Valve	Hand Valve	Drain condensate from Trap TP-232	Liquid placed in QC-104

Tag Number	Device	Description	Function	Notes
HV-229	Valve	Hand Valve	Syngas shut off valve	Normally closed - open to momentary test flammability in flare FL- 230
HV-3	Hand Valve	Scrubber drain valve	Throttles scrubber liquid draining from imp. scrubber IS-106	Gate valve
HV-4	Hand Valve	Condensate feed valve	Maintenance valve	Ball valve
HV-5	Hand Valve	Condensate drain valve to quencher QC-104	On-Off to manually drain tank CT-114 as needed	Ball valve
HV-6	Hand Valve	Polisher liquid drain valve	On-Off to manually drain polisher separator PS-110 as needed	Ball valve
HV-7	Hand Valve	Condensate drain valve to wastewater tank	On-Off to manually drain tank CT-114 as needed	Ball valve, emergency drain
HV-8	Hand Valve	Polisher separator PS-110 liquid discharge valve	Maintenance valve	Ball valve
HV-9	Hand Valve	Polisher separator PS-110 drain valve	Maintenance valve	Ball valve with plug
IS-106	Impingement Scrubber	Gas Cleaner	Removes high dew point tars and particulates from syngas	High velocity exchange gas cleaner - Debris drains into quencher QC-104
LC-216	Load Center	Three-Phase AC Load Center	Places electrical load on generator	480 VAC 60 Hz Three- phase forced convection resistance type
LFM-219	Liquid Fuel Usage Monitor	Sight glass style liquid fuel metering	Measures liquid fuel consumption	Research purposes only - measures liquid fuel consumption over 1 minute intervals
M-1	Hydraulic Motor	Rotary Gasifier Drive Motor	Drive motor that rotates reactor vessel RG-103	0.5 BHP motor power, total gear reduction is 8750:1, 1 rot/4 min., manual speed adj., manual rev.
M-2	Hydraulic Motor	Positive Displacement Blower Drive Motor	Drive motor for main gas blower PDB-105	5.0 BHP, automated variable speed, non-reversing
M-3	Hydraulic Motor	Polisher Drive Motor	Drive motor for gas polisher GS-109 and Polisher Pump PP- 113	3.5 BHP, direct drive to GS- 109, synchronous belt drive to PP-113, manual speed adj., manual rev.
M-4	Hydraulic Motor	Cooling Fan Drive Motor	Drive motor for condenser cooler C- 107	5.0 BHP, manual speed adjustment, manual reversing

Tag Number	Device	Description	Function	Notes
MFT-218	Main Fuel Tank	100 Gallon Main Diesel Fuel Tank	Main fuel tank for dual fueling	
MP-117	Metering Pump	Reflux oil metering pump	Meters reflux oil back into the gasifier	24 VDC brushless variable speed gear pump, 150 Watt
PDB-105	Positive Displ. Blower	Gas Mover	Main aspiration blower	Roots 45URAI-G, rotary lobe positive displacement, variable speed using hydraulic motor
PDT-101	Diff. Press. Transmitter	Flow Orifice Diff. Pressure	Instrument	Measures syngas flow to engine using flow orifice FO-112
PDT-102	Diff. Press. Transmitter	Quencher Liquid Level	Instrument	Indicates liquid level in quencher QC-104
PDT-104	Diff. Press. Transmitter	Polisher Separator Liquid Level	Instrument	Indicates liquid level in polisher separator PS-110
PM-215	Power Meter	Three-Phase AC Electrical Power Meter	Measures AC power produced by generator	Digital
PP-113	Polisher Pump	Circulates polisher liquid	Feeds polisher liquid to polisher, belt driven motor M-3	
PS-110	Polisher Separator	Liquid - Gas Separator	Removes polisher liquids from syngas	Gas exits separator saturated
PT-101	Pressure Transmitter	Quencher Static Pressure	Instrument	Quencher vacuum, represents differential pressure over Rotary Gasifier RG-103
PT-102	Pressure Transmitter	Static Pressure - Impingement Scrubber	Instrument	Syngas pressure at scrubber IS-106 outlet
PT-103	Pressure Transmitter	Downstream Orifice Static Pressure	Instrument	Static downstream pressure of sub critical flow orifice FO-112
QC-104	Quencher	Syngas Quencher	Quenches syngas temperature to 165 °F	Cools and cleans syngas, extinguishes flaming embers, removes particulates, condenses organics
RF-102	Ram Feeder	Hydraulic Ram Feeder	Feedstock handling	Compresses and pushes raw feedstock into the rotary reactor
RG-103	Rotary Gasifier	Thermal Reactor	Thermally converts solids and liquids to flammable gas	

Tag Number	Device	Description	Function	Notes
RH-111	Reheater	Heats syngas above dew point	Uses engine antifreeze heat to heat syngas above dew point	Gas exits reheater about 10-15 °F above saturation point
S-116	Strainer	Polisher liquid strainer	Strains debris from polisher liquid	100 mesh baskets
S-119	Strainer	Scrubber liquid strainer	Removes large debris	50 mesh
SP-120	Sample Point	Syngas Sampling Point	Filling point for sample bags and Summa containers	Contains condensate moisture trap
SP-236	Sample Port	Diesel exhaust analyzer port	Used for exhaust analyzer	Port in 4-in. diameter exhaust pipe
SP-237	Sample Port	Diesel exhaust sampling port	Used for exhaust sampling to fill Summa canisters	Stainless Steel 304 sampling train in 4-in. diameter exhaust pipe
TE-101	Type K Thermocouple	Temp of Syngas Exiting Reactor	Instrument	Mixture of syngas, organic vapor, and superheated steam - Normal 350 to 400 °F
TE-102	Type K Thermocouple	Temp of Quencher Liquid	Instrument	Mixture of pyrolysis oil and water - Normal 165 °F
TE-103	Type K Thermocouple	Temp of Syngas Exiting Quencher	Instrument	Saturated syngas with organic vapors - Normal 165 °F
TE-104	Type K Thermocouple	Temp of Syngas Entering Condenser	Instrument	Saturated syngas with organic vapors - Normal 155 °F
TE-105	Type K Thermocouple	Temp of Syngas Exiting Condenser	Instrument	Saturated syngas with organic vapors - Normal 90 to 100 °F
TE-106	Type K Thermocouple	Temp of Syngas Exiting Reheater	Instrument	Syngas heated 10 to 15 °F above dew point
TE-107	Type K Thermocouple	Temp of Reactor Charge 4- in. Uphill of Feed Point	Instrument	Reactor charge - normal operating temperature < 350 °F
TE-109	Type K Thermocouple	Temp of Reactor Charge 20- in. Uphill of Feed Point	Instrument	Reactor charge - normal operating temperature < 350 °F
TE-111	Type K Thermocouple	Temp of Final Diesel Exhaust at Release Point	Instrument	Temperature of diesel exhaust at final exhaust point
TE-201	Type K Thermocouple	Syngas Temperature at Engine Intake	Instrument	
TE-202	Type K Thermocouple	Exhaust Temperature at Turbo Discharge	Instrument	

Tag Number	Device	Description	Function	Notes
TP-232	Trap		Final moisture removal before introduction to engine	< 1 cup after full day run

3.3 Feedstock Handling System

Garbage bags containing waste feedstock are placed into feed bin FB-101. Ram feeder RF-102 uses a 35 ton hydraulically driven ram piston to shear, compress, dewater, and push the feedstock uphill into Rotary Gasifier RG-103. If the feedstock contains more than 40% moisture (wet basis), wastewater drains past the ram piston as the feedstock is compressed.

Ram feeder RF-102 is powered by hydraulic power unit HPU-118. For simplicity during research, hydraulic pump GP-4 is driven by an 8.5 horsepower gasoline engine M-5. Pump GP-4 is a two-stage 4:1 ratio gear pump rated for 16 GPM at 1000 psi and 4 GPM at 4000 psi. The pump automatically shifts from high flow-low pressure to low flow-high pressure as the resistance to compress and push the feedstock increases.



Figure 3-5. Ram Feeder, Tag # RF-102.



Figure 3-6. Plastic Bag of Mixed Waste Place in Feed Bin.

3.4 Rotary Gasifier

Cold and wet feedstock enters the Rotary Gasifier RG-103. Two thermocouples indicate the level of feedstock within the reactor. Thermocouple TE-107 is 4-in. uphill from the feedpoint and thermocouple TE-109 is 20-in. uphill from the feedpoint. The syngas exit is at the far uphill point within the gasifier.

The cold wet feedstock dries as the hot gases pass through the tumbling bed. Feedstock moisture evaporates to water vapor, which mixes with the syngas and exits the gasifier. Thermocouple TE-101 indicates the exit temperature of the syngas mixture. Dry feedstock devolatilizes on a very narrow layer of intense temperature gradient just downhill of the feed point. The remaining fixed carbon burns in the downhill section of Rotary Gasifier RG-103. The temperature at the downhill end where the aspiration air enters the reactor to burn the fixed carbon remains constant at 2000 to 2200 °F.

During steady state operation, the level of feedstock charge within the gasifier is maintained between 4 and 20 in. from the feed point. Thermocouples TE-107 and TE-109 indicate the level of feedstock as follows:

- 1. If TE-109 is about the same temperature as TE-101, the feedstock charge level is below 20-in. uphill of the feed point.
- 2. If the temperature of TE-109 is lower than TE-101, the feedstock charge level is above 20-in. uphill of the feed point, indicating the gasifier is over-full.
- 3. If the temperature of TE-107 is lower than TE-109, the feedstock charge level is between 4-in. and 20-in. uphill of the feed point.
- 4. If the temperature of TE-107, TE-109, and TE-101 are all about the same, the feedstock charge level is less than 4-in. uphill of the feed point, indicating the gasifier requires feeding.

The normal steady state operating temperatures are as follows:

- 1. TE-107 normally less than 250 °F.
- 2. Twenty inches uphill of the feedpoint at TE-109 and in the syngas exit pipe at TE-101 are approximately the same and normally operate between 250 to 350 °F.
- 3. Burning char zone about 1-in. uphill of the stationary spring plate operates consistently between 1800 to 2200 °F.

The gasifier thermally converts the raw feedstock completely into flammable syngas and ash. Any inert items mixed in with the feedstock, such as glass, metals, stones, soils, etc. discharge with the ash. The ash discharges through a narrow gap between the fixed spring plate and the rotating shell. The discharge arrangement naturally grinds clinkers to fine ash. An ash discharge door opens periodically to pass large items, such as metals, stones, glass, etc.

Hydraulic motor M-1 drives the gasifier to rotate slowly at about one rotation every 4 minutes. A variety of gear boxes are used to achieve a reduction ratio of 8750:1. The gasifier rotates reliably and without restriction or jamming during testing.

Hot diesel exhaust at a temperature between 800 to 1100 °F enters the gasifier shell at the downhill end. Exhaust heat transfers indirectly into the reactor through the rotating gasifier shell.

Cool diesel exhaust, at a temperature less than 450 °F, discharges through a nozzle located at the top of RG-103. Indirect heat provides sufficient energy to process exceptionally wet feedstocks (up to 70% moisture content – wet basis).



Figure 3-7. Rotary Gasifier RG-103.



Figure 3-8. Gasifier Nozzle, Spring Plate, and Syngas Discharge Pipe.

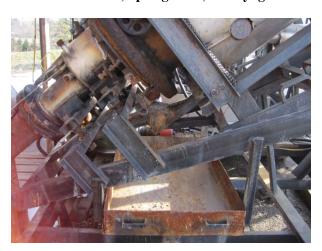


Figure 3-9. Ash Discharge Pan.



Figure 3-10. Diesel Exhaust Discharge Nozzle, Final Emission Point to Atmosphere.

3.5 Quencher

A mixture of syngas, oil aerosols, and water vapor flows through the gasifier exit pipe into quencher vessel QC-104. The mixture bubbles though a layer of liquid pyrolysis oil and water. The quencher immediately drops the syngas temperature to about 165 °F and extinguishes any flaming embers that may be entrained in the syngas stream exiting the gasifier. Thermocouple TE-102 indicates the temperature of the pyrolysis oil mixture. Pressure transmitter PT-101 indicates the aspiration vacuum and differential pressure transmitter PDT-102 indicates the liquid level in the vessel.

Oil aerosols condense into liquid pyrolysis oil within the quencher vessel. Water mixed in with the pyrolysis oil evaporates, saturating the syngas with moisture in the cavity above the liquid layer. Additional condensate water (32) is fed directly into the quencher vessel through hand valve HV-5, to provide sufficient moisture to maintain evaporative cooling.

The liquid temperature within the quencher is self-regulating and remains between 160 and 170 °F, regardless of the temperature and flow of the syngas entering the quencher. The normal temperature of the syngas mixture entering the quencher remains less than 350 °F, but may exceed 1200 °F when burning the gasifier totally out during a shut down. A liquid temperature in excess of 170 °F at TE-102 indicates water must be added to the quencher.



Figure 3-11. Quencher QC-104 Located to the Left of Rotary Gasifier RG-103.

3.6 Reflux Pump

Oil aerosols mixed with the syngas condense within the quencher, consistently raising the liquid level within the vessel during operation. Hot pyrolysis oil mixed with water at a temperature of about 165 °F exits quencher vessel QC-104, passes through strainer S-119, and enters metering pump MP-117. Variable speed metering pump MP-117 feeds pyrolysis oil back into the reactor vessel to maintain a constant liquid level in quencher vessel QC-104.

The liquid mixture enters the reactor through a dedicated conduit at the point of line flash gasification. This mixture is thermally cracked into lower molecular weight hydrocarbons. The cracking cycle continues until the molecular weight of the resulting hydrocarbons is low enough and the vapor pressure is high enough to evaporate as organic vapors into the syngas flow stream (C12 organics or less).

3.7 Aspiration Gas Mover

Saturated syngas exits the quencher, mixes with strained pyrolysis oil, and enters the intake of the rotary lobe positive displacement blower PDB-105. Hand valve HV-2 throttles the flow of the pyrolysis oil passing through the blower. This oil helps to seal the clearances within the blower, prevent the built up of tars on the rotary lobes, removes heat of compression, and is used as the primary scrubbing liquid within impingement scrubber IS-106.

Blower PDB-105 is driven by an infinitely adjustable variable speed hydraulic motor M-2. This blower aspirates gasifier RG-103 and directly varies the syngas production rate. A minimum aspiration rate of 7 standard cubic feet per minute (SCFM) of syngas is required to provide positive aspiration, which prevents syngas leakage from the air intake of gasifier RG-103.

The entire gasification system was designed for a syngas flow of 85 SCFM. The gasifier was tested to 60 SCFM, with insufficient hydraulic horsepower to drive aspiration blower PDB-105 being the limiting factor. The normal feed rate to the engine was between 20 and 25 SCFM for most feedstock mixes. The maximum flow of syngas into the engine was half to one third of the design flow, because the energy level of the gas was 2 to 3 times higher than expected. As a

result, the gasifier was significantly oversized for the engine-driven generator that was tested. The system could easily fuel an engine with twice the horsepower tested.

The mixture of saturated syngas and pyrolysis oil enter positive displacement blower PDB-105 at a vacuum of about 30 to 40 inches of water column. Thermocouple TE-103 measures the gas temperature at the blower inlet, which remains the about the same as the scrubbing liquid temperature TE-102, or about 160 to 170 °F. The blower isothermally compresses the gas to about 3 to 5 pounds per square inch (psi) pressure at the blower outlet. Check valve CV-1 prevents backflow into the quencher vessel if the blower were to stop.



Figure 3-12. Roots 45 URAI-G Positive Displacement Rotary Lobe Blower PDB-105.

3.8 Impingement Scrubber

The mixture of syngas and pyrolysis oil exit the blower and enter the impingement scrubber IS-106. The scrubber uses fresh oil mixed with recirculating oil to clean the syngas by high momentum exchange. A separator removes oil from the syngas stream and excess oil with high dew point tars drains back to quencher QC-104. Saturated syngas, free of pyrolysis oil and high dew point tars, exits the scrubber IS-106 at pressure PT-102. This oil, mixed with high dew point tars and ash, eventually gasifies as reflux and thermally cracks to low molecular weight hydrocarbons and ash. Any remaining organics in the oil ash fully burns with air within the burning char zone at temperatures between 1800 and 2200 °F. Oil ash mixes with feedstock ash, which discharges at the downhill end of the gasifier and falls into the main ash bin.



Figure 3-13. Impingement Scrubber IS-106.

3.9 Condenser Cooler

Syngas free of high dew point tars, exits the impingement scrubber saturated at temperature TE-104. The normal operating temperature of the syngas at TE-104 is about the same as TE-102 and TE-103, about 160 to 170 °F.

Condenser cooler C-107 is a combined syngas condenser and hydraulic cooler. A single fan, driven by variable speed hydraulic motor M-4, provides cooling air to both the syngas condenser and hydraulic oil cooler.

The syngas enters condenser cooler C-107 to remove moisture by reducing the dew point temperature by removing heat. Syngas mixed with liquid condensate discharge from the condenser. Liquid condensate is removed from the syngas using condensate separator CS-108. The condensate water, mixed with gasoline / diesel range organics drains from CS-108 and accumulates in condensate tank CT-114. The condensate tank periodically empties into quencher QC-104 (using hand valve HV-105), to provide sufficient free water for evaporative cooling and thermal cracking as reflux.

Hot hydraulic oil returning from hydraulic motors drains from hydraulic solenoid bank HS-214. Hot hydraulic oil passes through hydraulic cooler C-107 and cools to maintain a steady state operating temperature of 125 to 135 °F in tank HT-213. A thermostatically controlled hydraulic bypass valve (not shown) diverts oil from entering the cooler to maintain the target operating temperature if the fan is operating too fast. Cool oil exits hydraulic cooler C-107 and filters to 10 micron using hydraulic filter HF-225, before returning to hydraulic oil tank HT-213.

The objective is to vary the speed of the fan using hydraulic motor M-4, to condense the minimum amount of liquid required for quencher QC-104. The remaining moisture present in the syngas eventually passes through the engine as vapor. Removing excess liquid condensate, by excessively cooling the syngas at thermocouple TE-105, results in the removal of gasoline and diesel range organics. Condensing these organics can make the condensate water highly flammable and lowers the energy level of the syngas. Gasoline and diesel range organics should remain as vapor in the syngas mixture.

The shared fan creates operating problems. The fan must operate at a minimum speed to maintain a maximum hydraulic oil temperature of 135 °F. In most cases, this excessively cooled the syngas, providing excess condensate which had to be drained from the system. Reversing the fan to force heat from the hydraulic oil into the syngas condenser was occasionally necessary, especially in cold weather.



Figure 3-14. Condenser Cooler C-107 – Hydraulic Cooler End with Hydraulic Driven Cooling Fan.



Figure 3-15. BASCO Condensate separator CS-108.

3.10 Polisher

The primary purpose of the polisher is to remove low dew point tars and any remaining particulates from the syngas before fueling the engine. Saturated syngas mixes with polishing liquid at the gas polisher GP-109 intake. The polisher liquid is a mixture of ethylene glycol, water, and gasoline range liquids.

Gas polisher GP-109 mechanically transfers any remaining low dew point tars and particulates into the polishing liquid by high momentum exchange. The polishing liquid accelerates using an impeller driven by hydraulic motor M-3. The mixture of syngas and polishing liquid exit gas polisher GP-109 and enter the polisher separator PS-110, where the liquid separates cyclonically from the syngas.

Differential pressure transmitter PDT-104 indicates the level of the polishing liquid reservoir. Polishing liquid circulates through the polishing system by polisher pump PP-113. This pump is synchronously belt driven from hydraulic motor M-3. Polishing liquid exits the polisher separator PS-110 and enters strainer S-116, which contains 100 mesh baskets. S-116 baskets rarely required cleaning (once every 30 to 50 operating days). Check valve CV-3 prevents the backflow of syngas if pump PP-113 stops.

Heat exchanger HE-115 uses engine coolant to heat the polishing liquid to about the same temperature as TE-105. HE-115 regulates the temperature of the polishing liquid to avoid condensation or evaporation to maintain a constant liquid level in polisher separator PS-110. Heating the polishing liquid allows gasoline range organics to vaporize into the syngas, greatly increasing the heating value. Excess condensation in PS-110 occurs when the temperature of the polishing liquid is lower than TE-105. In this case, HE-115 heats the polisher liquid to a temperature 10 to 20 °F higher than TE-105 to evaporate polishing liquid into the syngas stream, lowering the liquid level in PS-110.

The polishing liquid constantly regenerates similar to the quencher liquid. Excess polishing liquid drains from the system using hand valve HV-6 and flows into quencher QC-104, where the liquid naturally fractions and cracks into additional hydrocarbons as reflux.



Figure 3-16. Gas Polisher GP-109 Direct Drive by Hydraulic Motor M-3.



Figure 3-17. Polisher Separator PS-110.

3.11 Gas Reheater

Syngas exits polisher separator PS-110 saturated and enters the gas reheater RH-111, which heats the syngas to 10 to 15 °F above the saturation dew point temperature using hot engine coolant. Dry gas at a relative humidity less than 80% exits the reheater to fuel the engine.



Figure 3-18. Gas Reheater RH-111, a Fabricated Heat Exchanger.

3.12 Flow Orifice

Flow orifice 112 measures the mass flow of syngas using thermocouple TE-106, differential pressure transmitter PDT-101, and downstream static pressure PT-103. The automation system constantly varies the speed of positive displacement blower PDB-105 to insure the actual flow of syngas measured at FO-112 remains equal to the required set point flow. Check valve CV-2 serves as a safety non-return valve if positive displacement blower PDB-105 stops.

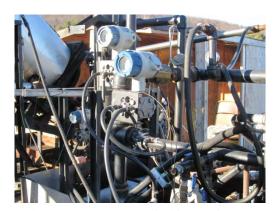


Figure 3-19. Flow Orifice FO-112.

3.13 Syngas Sampling Port

All syngas samples were taken using sampling port SP-120, located directly downstream of the flow orifice. SP-120 was used to fill all sample bags and Summa containers. The sample train was fabricated of stainless steel 304. The piping contained a drop out container to remove any liquids that condense when sampling. The piping was purged with syngas for 60 seconds before filling sampling containers.



Figure 3-20. Syngas Sampling Port SP-120.

3.14 Trailer Interconnections

The following connections are required between the two trailers:

- 1. 1-1/4-in. Hydraulic supply hose.
- 2. 1-1/4-in. Hydraulic return hose.
- 3. ¾-in. Hydraulic case drain hose.
- 4. 2-in. syngas hose.
- 5. ¾-in. Hot engine coolant supply hose.
- 6. ¾-in. Cool engine coolant return hose.
- 7. 4-in. Insulated diesel exhaust pipe.
- 8. 24 VDC power supply cable from engine charging system.
- 9. Ethernet data communication cable.



Figure 3-21. Interconnections between Trailers.

3.15 Flammability Test Flare

Syngas is not flared during startup or shut down. All of the syngas produced passes through the diesel engine. Flare FL-230 is a small flare cup that allows the momentary testing of syngas flammability during startup and shut down. Hand valve HV-229 throttles a small flow of syngas to flare FL-230, from the main syngas flow to the engine. Testing sustained combustion at startup indicates the gas is of sufficient energy to provide appreciable liquid fuel savings. The loss of combustion permits the engine to shut down when stopping the system.



Figure 3-22. Syngas Flammability Test Flare FL-230.

3.16 Syngas Fueling to Engine

Dry syngas enters 50µm guard filter GF-231 to remove any foreign debris, such as dirt from handling the 2-in. syngas hose connection when connecting the two trailers. Diesel engine DG-220 is a considerable distance (about 30 feet) from gas reheater RH-111, resulting in significant cooling in cold weather conditions. The piping and hose act as a heat exchanger, allowing the syngas to drop below the dew point and causing condensation. GF-231 also serves as a moisture trap to capture any liquids that may have condensed between the reheater and the engine. Future systems should locate the engine adjacent to the reheater to prevent condensation issues.

Trap TP-232 acts as a final guard to remove any remaining liquid from the syngas. In practice, very little water accumulates within this vessel (2 tablespoons per day).

Check valve CV-206 prevents air from entering the system in the event positive displacement blower PDB-105 suddenly stops and serves as a flashback preventer. Engine intake filter EIF-233 provides filtered aspiration air to mix with raw syngas at the inlet of the turbo charger compressor.

3.17 Diesel Engine-Driven Generator

Diesel engine-driven generator DG-220 drives a 60 kW synchronous electric generator EG-221. The generator produces 3-phase alternating current electrical power at 480 VAC and 60 Hz frequency. Power meter PM-215 monitors the voltage, current, frequency, power factor, and power generated. Load center LC-216 consumes the electrical power generated at varying loads set by the operator.



Figure 3-23. 60kW Diesel Engine-Driven Electric Generator DG-220.



Figure 3-24. Three-Phase Digital Power Meter PM-215.



Figure 3-25. Load Center LC-216.

3.18 Fuel Consumption Measurement

Syngas fueling reduces liquid fuel consumption. Liquid fuel usage monitoring system LFM-219 volumetrically monitors the amount of liquid fuel being consumed by the engine. Under normal conditions, liquid fuel (2-24) flows out of the main fuel tank and flows (2-20) to the engine fuel injection system. The engine uses an open fuel circuit allowing unused fuel (2-21) to return to the main fuel tank MFT-218 (2-25).

A 60 second duration "Clip test" is used to measure the volumetric consumption of liquid fuel using the following procedure:

- 1. Isolate main fuel tank MFT-218 by simultaneously closing hand valves HV-207 and HV-211.
- 2. Open hand valve HV-209 to fill the fuel sight glass using auxiliary fuel tank AFT-217. Close HV-209 when the fuel glass is adequately full.
- 3. All of the liquid fuel entering the engine withdraws from the fuel sight glass. The volumetric flow of fuel entering the engine (2-22) is measured over a 60 second duration using a dry erase marker.
- 4. The calculated volumetric flow rate of fuel into the engine is the product of the cross sectional area of the sight glass and the drop in fuel over a 60 second period.



Figure 3-26. Liquid Fuel Usage Monitoring System LFM-219.

3.19 Hydraulic Power System

The gasification system is mechanically driven by hydraulic powered components. The engine is equipped with a mechanical power take off that is separate from the crankshaft, which drives constant displacement hydraulic gear pump GP-235. A low pressure (< 1800 psi) and constant flow system was selected due to safety, simplicity, and economics.

Hydraulic oil from tank HT-213 provides suction flow to the gear pump. A heater was added to tank HT-213 to prevent foaming when the oil temperature is less than 50 °F. Pressurized oil at 1700 psi flows from the generator trailer to the gasification trailer. Hydraulic solenoid bank HS-121 uses dual coil three-position closed center hydraulic valves to control each hydraulic motor on the gasification trailer. Blower PDB-105 uses proportional hydraulic control valve downstream of the solenoid to vary shaft speed. Block mounted relief valves regulate the maximum system pressure at 1700 psi by allowing unused oil to return to hydraulic oil tank HT-213.

Low pressure oil exits HS-214 at about 25 psi and flows to hydraulic cooler C-107. A thermostatic control valve set at 130 °F (not shown) allows cool oil to bypass the cooler. This valve uses a thermal element to open, forcing hot hydraulic oil (over 130 °F) to flow through cooler C-107. Cool oil exits cooler C-107, flows to the generator trailer, filter HF-225, and tank HT-213.



Figure 3-27. Gear Pump GP-235 Mounted to Engine Power Take off.

3.20 Engine Exhaust System

Engine exhaust from the outlet of the turbo charger expander flows into exhaust catalytic converter ECC-234. Thermocouple TE-202 indicates the exhaust temperature at the inlet of converter ECC-234. This temperature varies from 900 to 1300 °F, depending on the gaseous fueling rate and engine load. ECC-234 is an after-market platinum based catalytic converter, which burns remaining hydrocarbons in the exhaust stream.

Engine exhaust exits converter ECC-234 and flows through an insulated 4-in. diameter pipe that interconnects the generator trailer to the gasification trailer. The onsite diesel exhaust analyzer was connected directly to diesel exhaust sampling point, located on the gasification trailer. Summa canisters were filled using diesel exhaust sampling point SP-237 for off-site analysis by Wadsworth Labs. The sample location was directly adjacent to the generator, 24 in. downstream of the discharge port of ECC-234, before muffler entrance. The Summa containers were certified cleaned and pre-evacuated to perfect vacuum before sampling. The stainless steel sampling lines were allowed to thermally stabilize and purge before filling. An inline particulate filter was not used, allowing diesel particulate matter to freely enter the Summa container.

Hot diesel exhaust, at approximately 800 °F flows into the annulus between the insulated stationary outer shell and the rotating inner shell at the downhill end of the gasifier. The rotating shell absorbs exhaust heat, which is primarily used to dry the feedstock within the reactor. Cool diesel exhaust discharges to atmosphere through the nozzle located at the uphill location on reactor RG-103. Thermocouple TE-111 indicates the diesel exhaust temperature, which is normally less than 450 °F.



Figure 3-28. Catalytic Converter ECC-234 Mounted Directly to Turbo Expansion Turbine Outlet.



Figure 3-29. Diesel Exhaust Muffler and Pipe; Stainless Steel Exhaust Sampling Point SP-237.

3.21 Automation System

The system was controlled by an Allen Bradley Micrologix 1600 programmable logic controller (PLC) and a Panel View Plus 1000 color touch screen located in a NEMA 4 electrical enclosure mounted on the gasifier trailer. Rockwell Automation Factory Talk software was used as a Supervisory Control And Data Acquisition (SCADA) system for data logging and collection.

A separate control panel was mounted on the generator trailer. This panel contained an Allen Bradley Micrologix 1100 programmable logic controller that communicated data with the gasifier PLC by Ethernet.

The system was operated remotely from a control room located within the Center for Environmental Science and Technology using the Factory Talk SCADA software running on a laptop computer. A wireless Ethernet router that is located within the generator trailer control panel was used to provide a wireless link between the gasifier control system and the control room.

All of the electrical components on the system and the entire automation system operate on 24 volts DC. Each trailer is powered by a 12 VDC to 24 VDC step up power converter located on the generator trailer to provide regulated 24 VDC power. The entire system is powered using the 12 VDC charging system and alternator mounted on the generator engine.



Figure 3-30. Main System Control Enclosure with Color Touch Screen Mounted on Gasifier Trailer.

4. Summary of Analytical Data and System Operation

4.1 Overview

Gasification testing on six different feedstock mixes that are representative of wastes encountered on forward operating bases was completed successfully. The system converted all of these waste mixes into usable electricity at a significant net energy gain.

A 60 kW diesel engine-driven generator operated at approximately 66% to 75% crankshaft load for 244 hours operating on syngas derived from the six SERDP waste mixes. The average liquid diesel fuel savings during the majority of these tests varied between 50 and 65%, with 81% being the maximum savings measured.

The engine operated a total of 472 hours on various waste derived syngas. Engine disassembly and inspection commenced at the conclusion of hot testing. The engine was disassembled, inspected, and reassembled to factory rebuilt specifications. No internal wear, loss of compression, or cylinder damage occurred due to operating on waste derived syngas.

The rotary gasification system has numerous unique advantages when compared to other WTE technologies, including small size, reliability, simplicity, and safety. The exhaust emissions when operating dual fueled are significantly lower than when operating on 100% liquid diesel fuel.

4.2 Safety

A significant advantage of the IIFPRG system is safety. A key design philosophy was simplicity and operator safety.

A significant finding from the research was the natural production of pyrolysis oil within the rotary gasifier dramatically improves overall safety of the system. Various changes to the system were required to handle the pyrolysis oil production and reformation. These changes resulted in the highest level of safety possible from any gasification system.

The production of free hydrogen can be very dangerous. Hydrogen has a high flame propagation speed, which greatly increases the risk of violent explosions within process vessels by direct ignition by a flaming ember or by flashback, where the combustion of syngas initiates at the engine and travels backwards through the scrubbing system towards the gasifier. The rate of combustion during flashback is so violent, the flame within the pipe acts as a jet pump, drawing air by Venturi action back into the scrubbing system and providing sufficient oxygen for a violent explosion.

The overall design of the system effectively addresses flashback by various mechanical design features and by intentionally preventing the production of free hydrogen. The gasifier design forces free hydrogen to react and reform into less volatile hydrocarbons, which evaporate into the syngas stream as gasoline and diesel range liquids.

The system implements the following safety features:

- 1. The rotary gasifier operates at slightly negative pressure.
- 2. The gasifier vessel is continuously welded and does not require any mechanical seals to prevent air from leaking into the system.
- 3. The syngas piping and scrubbing system is continuously welded with minimal joints, limiting the risk of leaks in the system.
- 4. The scrubbing system can be hermetically sealed, preventing the leakage of gas and liquids to atmosphere and preventing human exposure.
- 5. Syngas must be bubbled through a bed of liquid pyrolysis oil.
- 6. Immediately extinguishes any flaming embers entrained with the syngas.
- 7. Acts as a liquid flame stop if flashback occurs.
- 8. The amount of free hydrogen produced by the system is very low compared to other gasification technologies. Free hydrogen reforms into less volatile hydrocarbon gases and vapors.
- 9. Unreacted feedstock moisture causes the syngas to dilute with water vapor, which greatly reduces gas volatility with virtually no effect on engine performance.
- 10. Volume in process vessels are kept to a minimum and are designed with stirring velocities to prevent oxygen accumulation.
- 11. Gas residence time in entire system from gas production to engine combustion is less than 500 milliseconds. Gas is not stored and is immediately consumed.
- 12. The reactor operates at very low internal temperatures (less than 350 °F) preventing autoignition at the point where feedstock enters the gasifier.
- 13. The gasifier design prevents air from entering the system during an unexpected loss of aspiration due to a mechanical failure. Syngas flows backwards and gently combusts at the ash withdrawal point until aspiration is restored or the system cools.
- 14. Able to automatically adjust gas production to demand over a wide range of flows, providing a dramatic turn down ratio.
- 15. Gasifier naturally regulates the flow of aspiration air into the reactor based on thermal demands, which stops oxygen from entering the system at all times, preventing the need for the automation system to regulate the flow of blowing air to maintain safe oxygen levels during upset conditions.
- 16. Syngas is fed into the engine from startup through shut down. A combustion flare is not required or used.

4.3 Waste Mixes Used in Testing

Multiple field waste studies have been conducted by DoD agencies. Six synthetic mixes that either closely represent the actual waste content observed or are of significant military interest for disposal were developed for prototype testing as follows:

- 1. <u>Standard long term mix</u> consisting of 15% (by weight) corrugated cardboard (OCC), 15% office, news, and mixed clean paper, 6% HDPE plastic, 6% PET plastic, 6% PP plastic, 20% wet food waste, 24% wood waste, 4% inerts (metals, glass, stones, soils), and 4% textiles (polyester and cotton).
 - a. The moisture content of the mix is 28% (wet basis).
 - b. The HHV (dry basis) of the mix is 9559 BTU/lb.

- c. Proximate analysis of the mix (dry basis) is 80.3% VM, 10.0% ash, 9.6% FC.
- 2. <u>50% Plastics</u> consisting of 15% HDPE plastic, 15% PET plastic, 15% PP plastic, 20% wet food waste, 15% wood waste, and 20% chopped rubber (mostly sequencing batch reactor [SBR]).
 - a. The moisture content of the mix is 21.7% (wet basis).
 - b. The HHV (dry basis) of the mix is 13787 BTU/lb.
 - c. Proximate analysis of the mix (dry basis) is 80.3% VM, 10.0% ash, 9.6% FC.
- 3. <u>33% Petroleum, Oil, Lubricants (POL)</u> consisting of 15% corrugated cardboard (OCC), 5% office, news, and mixed clean paper, 15% wet food waste, 20% wood waste, 2% textiles (polyester and cotton), and 10% chopped rubber (mostly SBR).
 - a. The moisture content of the mix is 18.3% (wet basis).
 - b. The HHV (dry basis) of the mix is 12080 BTU/lb.
 - c. Proximate analysis of the mix (dry basis) is 84.3% VM, 5.4% ash, 10.1% FC.
- 4. <u>50% Food</u> consisting of 20% corrugated cardboard (OCC), 15% office, news, and mixed clean paper, 3% HDPE plastic, 3% PET plastic, 3% PP plastic, 50% wet food waste, 5% wood waste, and 1% inerts (metals, glass, stones, soils).
 - a. The moisture content of the mix is 44.3% (wet basis).
 - b. The HHV (dry basis) of the mix is 8264 BTU/lb.
 - c. Proximate analysis of the mix (dry basis) is 80.3% VM, 10.0% ash, 9.6% FC.
- 5. <u>100% Construction</u> consisting of 15% corrugated cardboard (OCC), 5% office, news, and mixed clean paper, 2% HDPE plastic, 2% PET plastic, 2% PP plastic, 10% wet food waste, 50% wood waste, and 14% inerts (metals, glass, stones, soils).
 - a. The moisture content of the mix is 29.2% (wet basis).
 - b. The HHV (dry basis) of the mix is 7095 BTU/lb.
 - c. Proximate analysis of the mix (dry basis) is 65.3% VM, 23.5% ash, 10.6% FC.
- 6. <u>40% Tires</u> consisting of 8% (by wt.) corrugated cardboard (OCC), 8% office, news, and mixed clean paper, 5% HDPE plastic, 5% PET plastic, 5% HIPS (high index polystyrene) plastic, 8% wet food waste, 7% wood waste, 5% inerts (metals, glass, stones, soils), 5% textiles (polyester and cotton), and 40% chopped rubber (mostly SBR).
 - a. The moisture content of the mix is 14.8% (wet basis).
 - b. The HHV (dry basis) of the mix is 10374 BTU/lb.
 - c. Proximate analysis of the mix (dry basis) is 67.3% VM, 17.2% ash, 15.7% FC.

4.4 Syngas Chemistry

The IIFPRG reactor was originally to produce synthetic gas chemistry similar to updraft gasifiers. The percent volume of each component gas was expected to vary between the low energy and the high energy chemistry shown in Table 4-1.

The expected HHV of the gas was between 81 and 144 BTU per standard cubic foot (BTU/scf). Syngas of similar chemistry marginally sustains combustion (with significant flame separation)

at a HHV greater than 110 BTU/scf in an open burn cup. A HHV greater than 140 BTU/scf is required for reliable sustained combustion. The projected syngas mixture was to have marginal flammability sufficient to co-fuel a diesel engine.

The intent of gasification is to devolatilize solid and liquid feedstock using thermal energy to the lowest molecular weight component gases possible, which are primarily hydrogen, carbon monoxide, and a small amount of methane gases. The chemical equilibrium of these reactions is well established and understood. As shown in Table 4-1, the energy content (HHV) of pure hydrogen and carbon monoxide gas are similar (326 and 323 BTU/scf), which is about $1/3^{rd}$ the energy content of natural gas.

A mixture of fixed carbon and ash remain after the feedstock is fully devolatilized. The IIFPRG reactor uses flaming pyrolysis, which burns the remaining fixed carbon with air to provide the heat necessary to sustain the thermochemical reaction. The combustion of fixed carbon dilutes the syngas with carbon dioxide and nitrogen, which are inert and contribute no energy value.

The traditional syngas mixture consists of hydrogen, carbon monoxide, carbon dioxide, nitrogen, and a small amount of methane. The design of the IIFPRG reactor is to handle exceptionally wet feedstocks by preventing the highly endothermic water-gas reaction, which converts water into additional hydrogen and carbon monoxide gases. The design prevents the water shift reaction, which converts water and carbon monoxide to additional hydrogen and carbon dioxide. The reactor design limits hydrogen production to less than 9% by volume in the syngas mixture, primarily to conserve the highly endothermic process of converting water to hydrogen gas.

_	-		7 0		
	HHV	Low Energy	Component	High Energy	Component
Component	BTU/scf	% Volume	BTU/scf	% Volume	BTU/scf
Hydrogen	326	5%	16.3	10%	32.6
Carbon Monoxide	323	17%	54.91	25%	80.75
Methane	1011	1%	10.11	3%	30.33
Carbon Dioxide	0	9%	0	15%	0
Nitrogen	0	68%	0	47%	0
		HHV Total =	81	HHV Total =	144

Table 4-1. Expected Syngas Chemistry.

4.5 Unexpected Performance and Results Regarding Pyrolysis Oil

Before the interim report issued in March 2014, the IIFPRG gasifier was successfully tested on various cafeteria waste, wood chips, and biomass, which produced small quantities of liquid "biocrude" pyrolysis oil that condensed out of the gas and accumulated at dry points in the gas cleanup system. The production rate of biocrude oil was relatively low (1 to 2 gallons per hour) and was difficult to measure due to the design of the gas cleanup system. Excess oil was drained from the system at the conclusion of testing each day.

Testing on various SERDP waste mixes commenced during the summer of 2014. Gasifying representative Forward Operating Base (FOB) waste mixes containing paper, cardboard, plastic, rubber, textiles, and POL greatly increased the production of pyrolysis oil to amounts that were 4 to 6 times greater than previous observations. *This event dramatically changed the entire progression of this project.*

Various attempts to adjust process conditions to reduce oil generation failed (temperatures, flows, feeding methods, rotational speed, etc.). As a next step, multiple mechanical changes to the internals of the gasifier were also tested. Trials were unsuccessful and the gasifier did not produce flammable gas due to uncontrolled combustion of gas within the reactor when attempting to crack the oil into synthetic gas at higher temperatures.

4.5.1 Research on External Cracking Methods

Various methods were considered to crack the pyrolysis oil and tars after the syngas exited the reactor. The following methods were investigated:

- 1. Use plasma or carbon element electric arc to heat the mixture of syngas, oil vapor, and steam to a temperature of 2200 °F for at least 10 milliseconds retention on a platinum catalyst. The energy just to raise the temperature of the syngas mixture to the reaction temperature is over 200,000 BTU/hr. The amount of thermal energy just to heat the mixture will require 60 kW of electricity, which is all of the power generated, making an electrical powered cracking concept a net energy loss.
- 2. Energy recovery from exothermic cracking (partially burning on a catalyst) would be nearly impossible from a practical standpoint due to the lack of heat exchanger survival at the required operating temperatures and fouling.
- 3. Cracking the oil on a red-hot bed of burning carbon fueled by coal or coke. Researchers determined about 25 to 50 pounds per hour of coal or coke is required to sustain this reaction, since significant thermal energy is required for cracking the steam mixed with the syngas (not possible to prevent the water-gas and water shift reactions). This option has numerous safety issues, greatly increases complexity, significantly reduces the energy level of the syngas, and was determined not practical for use on FOB's.

Researchers at SUNY Cobleskill decided the best way to thermodynamically crack the pyrolysis oil would be to separate the liquids from the syngas and then use the burning char layer within the reactor for thermal cracking by pumping the liquids back into the reactor as reflux.

4.5.2 Development of Reflux Concept

The gasifier operates on the concept of "tumbling line flash gasification", where cold wet feedstock directly contacts the burning layer of red-hot char on a narrow line within the reactor. The temperature gradient is in excess of 1300 °F over a distance the length of which is less than 2-in. Feedstock devolatilizes by "flash pyrolysis" at a small interface area within the reactor.

Flash pyrolysis is well understood in other gasification technologies and is commonly used to generate high amounts of liquid pyrolysis oil. Researchers at SUNY Cobleskill eventually accepted the fact that it would be impossible to stop the production of liquid pyrolysis oil and it is not practical to crack these liquids external to the reactor.

The amount of oil production created numerous problems and serious safety concerns with the original scrubbing system that had to be resolved before further testing could occur. Safety issues included the elimination of the dust cyclone and numerous vessels with large volume, which could allow air to leak into the system and oxygen to accumulate in dead spaces. The original

scrubbing system also used waste crankcase oil as the scrubbing liquid, which quickly diluted with pyrolysis oil.

The quantity of pyrolysis oil produced required consistent draining from the system during operation and became a liquid waste disposal problem. A 5-hour test run could easily produce 30 to 40 gallons of pyrolysis oil, quickly filling 55 gallon storage drums. Researchers felt that the only way to complete the SERDP run testing was to develop a way to re-gasify the high quantities of pyrolysis oil as an effective means of disposal.

The pyrolysis oil was originally viewed as a problem, but was quickly found to be an asset if it could be used scrub the gas of tars and particulates, and then meter the "dirty" oil back into the reactor as reflux for disposal by re-gasification within the 2200 °F burning carbon layer. The implementation of this concept required major modifications to both the reactor and the entire scrubbing system, but dramatically improved the entire performance of the system while enhancing simplicity and optimizing safety.

Significant research was required to modify the reactor and develop a scrubbing system that could work reliably using the pyrolysis oil created by the reactor as the scrubbing liquid. This work was completed throughout 2014.

Numerous advantages to this concept quickly became apparent to researchers as follows:

- 1. The scrubbing system removes tars and particulates from the syngas and forces contaminates into the pyrolysis oil.
- 2. Pumping pyrolysis oil back into the reactor as reflux dramatically improves the energy value of the synthetic fuel gas (by a factor of five), which is significantly different than traditional syngas from gasification.
- 3. Dial-in energy value possible. The pumping rate directly affects the heating value of the syngas mixture. The heating value of the gas dramatically changes when the operator adjusts the speed of the reflux pump.
- 4. Particulates in the pyrolysis oil separate within the reactor and discharge with the normal feedstock ash.
- 5. Removing moisture by thermally cooling syngas also condenses significant amounts of gasoline and diesel range liquids. These compounds crack within the gasifier by mixing condensate with the reflux flow.
- 6. Unreacted oil naturally oxidizes near the air entry, greatly increasing the thermal energy within the reactor.
- 7. Significant improvement in overall system safety and reliability.
- 8. Ease of operation. The reactor gravitates to a natural thermal operating point where the aspiration air self-varies based on equilibrium energy of the chemical reactions, without the need of automation and controls.

Another observation after the pyro oil was added back to the gasifier was a dramatic reduction in liquid diesel fuel consumptions at lower gas flows, indicating a much greater energy value within the syngas;

4.5.3 Additional Gaseous Hydrocarbons

The above observations indicate there are additional flammable hydrocarbons within the syngas contributing to the excess energy. Researchers initially felt these hydrocarbons were limited to the gaseous C2, C3, and C4 family of organics (as is the case with downdraft gasification). The GC located at SUNY Cobleskill was calibrated during the summer and fall of 2014 to indicate C2 through C4 organics, but tests continued to indicate the GC analysis was missing significant hydrocarbons that were contributing to the energy level of the gas. In many cases, the energy level predicted by the GC chemistry was under-predicted by over 100% when compared to the combustion based gas analyzer.

The combustion based analyzer predicted wet gas energy values in excess of 280 BTU/scf, when the GC predicted a dry energy content of 130 BTU/scf. The combustion based analyzer was very close to the thermodynamic energy balance around the engine, further raising the suspicion of additional C5+ hydrocarbon vapors within the syngas.

In the fall of 2014, it was decided to do further analysis of both syngas and diesel exhaust samples to the New York State Dept. of Health, Wadsworth Labs. This lab has very extensive capabilities, and can provide a full organic range analysis.

4.5.4 Vapor Phase Organics

Organic psychrometric analysis indicates a significant amount of liquid organics can evaporate into the syngas mixture in the form of organic humidity, similar to how gasoline vapors evaporate into air at the intake of a spark ignition internal combustion engine. The ability of the liquids to evaporate into the gas depends on the molecular weight and vapor pressure of the liquid, as well as the temperature of the syngas. Analytical analysis indicated significant amounts of C5 through C9+ organic liquids can evaporate into the gas, contributing to the energy value of the gas mixture.

4.6 Process Description Used for Waste Mix Testing

Rotary reactor RG-103 fully dries and devolatilizes each feedstock mix using thermal energy from diesel engine exhaust (indirect heat transfer) and from burning the remaining fixed carbon in the feedstock using air. Feedstock moisture flashes to superheated steam that mixes with the syngas before exiting the reactor. Condenser C-107 removes the majority of moisture from the syngas before sampling point SP-120 using condensate separator CS-108, but the condensate obtained during early tests (Jan/Feb 2015) was highly flammable (similar to gasoline). All subsequent tests after Feb. 2015 operate with the lowest possible condenser fan speed (hydraulic motor M-4) to avoid producing excessive condensate while providing adequate cooling to the hydraulic system. Excess condensate was transferred to quencher QC-104. Heat from the engine cooling system was added to polisher GP-109 liquid using heat exchanger HE-115 to obtain an equilibrium liquid level in the polisher separator PS-110 (no condensation or evaporation). Excess condensate was drained from condensate tank CT-114 into a wastewater drum only when temperature conditions could not be maintained to evaporate all condensate produced due to weather conditions or equipment limitations. The objective for each test was to evaporate all of the condensate liquid into the syngas, producing a wet gas and recovering the energy value of

any organics mixed in the liquids. The resulting moisture content in the syngas at the sampling point was less than 15% by mass for all tests.

The reactor flash gasifies feedstock, which creates significant amounts of pyrolysis oil. The production of oil varies based on the feedstock and was in excess of 25% of the thermal energy in the unreacted feedstock. Oil aerosols mixed with the syngas condense into a liquid within quencher vessel QC-104, which scrubs the gas of high dew point tars at an equilibrium temperature of 165 °F. The quencher naturally operates consistently at 165 °F by evaporative cooling due to the presence of steam and water mixed in the pyrolysis oil.

Variable speed reflux metering pump MP-117 regulates the flow of reflux, which is a mixture of oil and condensate from quencher vessel QC-104 and into the reaction zone within the gasifier RG-103. The speed of the pump was manually set by the operator during each test to maintain a constant level within the quencher vessel QC-104. Condensate mixed with pyrolysis oil thermochemically cracks within the reactor into lighter organics (C12 or less) at temperatures approaching 2200 °F. The reflux mixture continually circulates and cracks until the combination of molecular weight and vapor pressure allow these organics to fully evaporate and leave the process as vapor with the syngas. Reflux pump MP-117 was adjusted each time feedstock was added to maintain a consistent liquid level in quencher QC-104 for the test duration tests.

Feedstock devolatilizes to fixed carbon within the reactor. Air enters the bottom of the reactor to burn this fixed carbon fully to ash. The combustion products (mostly carbon dioxide and nitrogen) mix with the syngas and exit the reactor. The reactor operated naturally aspirated on air for all tests.

Low dew point tars are removed downstream of condenser C-107 by polisher GP-109. The polisher uses a mixture of ethylene glycol and water at high momentum exchange to scrub the gas. The temperature of the polisher liquid was manually adjusted by the operator to maintain the same temperature or slightly higher than the condenser outlet, minimizing the gain or loss of polishing liquid. The ethylene glycol consistently evaporates into the syngas mixture and was not replaced. The polisher operates on 100% condensate, which has a high gasoline range liquid content and did not freeze during the cold weather tests. The polisher liquid regenerates when excess condensate accumulates in polisher separator PS-110 due to the loss of temperature control (manual adjustment or equipment limited), requiring the transfer of liquid to quencher QC-104 at least once per test run, where the tars in this liquid are eventually re gasified as reflux.

Reheater RH-111 uses excess thermal energy from the engine block to heat the syngas mixture about 15 °F above the pressure dew point. The syngas sampling point was directly downstream of the reheater.

Syngas is mixes with intake air and combusts in 60 kW diesel engine-driven generator DG-220. The engine governor automatically adjusts the liquid fueling rate based on the gaseous fueling rate. As the gaseous fueling rate increases, the liquid diesel fuel consumption decreases, with a maximum possible liquid fuel savings of about 81%.

4.7 Sampling Results

4.7.1 Syngas Sampling Procedure

A single feedstock mix was run for each test day. One syngas sample and one diesel exhaust sample was obtained at the midpoint of each test. A 4-hour test normally takes 6 to 8 hours from engine on until engine off.

The syngas sample is obtained downstream of the reheater at sampling port SP-120. Gas was allowed to flow through the sampling train for at least 60 seconds to allow full purging and thermal stabilization. A moisture trap at the sampling point removes liquid condensate. The sampling bag or Summa container was connected with syngas flowing through the sampling train to minimize the risk of air contamination.

Syngas is normally a mixture of carbon monoxide, hydrogen, nitrogen, carbon dioxide, and a slight amount of methane. Multiple samples were analyzed on site using a GC and combustion based calorimeter. Prior research on downdraft gasification indicated a close match in HHV between the GC and combustion based calorimeter when analyzing for these components.

A significant difference in heating value was observed between the GC and combustion based calorimeter when testing the rotary reactor. Researchers felt the mismatch was the difference of gaseous range organics (C2 to C4). The GC was re-calibrated to include C2 to C4 organics, which reduced the mismatch of HHVs between the two methods. A significant mismatch still occurs, especially when feeding reflux oil into the reactor, indicating the presence C5+ organic vapors in the syngas mixture. The main objective of Wadsworth Labs was to identify the type and content of these higher level organics that are in the syngas mixture.

The main objective of the syngas sampling is to determine the presence of gaseous organics (C2 to C4) and vapor organics (C5 to C9+). Even in small amounts, these organics were found to greatly increase the gross heating value of the syngas.

The following objectives were for the syngas analysis at Wadsworth Labs:

- Identify all significant organic compounds in the syngas.
- Measure each significant compound to the best possible accuracy.
- Determine the percentages of total hydrocarbons in each group. The group being determined by the number of carbon atoms (C2, C3, C4, C5, through C9). This percentage includes significant peaks, as well as insignificant peaks.
- Group hydrocarbons present based on their structures, i.e., alkanes, alkenes, aromatics, etc.
- Provide chromatograph outputs sheets.
- Summarize data in tables with compound names and percentages, as appropriate.
- Compare the chromatograph footprint to standard commercially available fuels.
- Provide a brief written summary of the method, equipment, dilution amount, findings, concerns, conclusions, and recommendations.

A full day test was conducted on each SERDP waste mix, with the exception of the 50% plastics run. High plastics content did not create a problem during testing, but increased the viscosity of

the pyrolysis oil used in quencher QC-104 after the test was complete and the system cooled overnight. The pyrolysis oil solidified in QC-104 and in all adjoining equipment where the pyrolysis oil contacts. A second duplicate test at 50% plastics content was cancelled to avoid a repeat of the problems experienced. The plastics content should be limited to less than 30% by mass to avoid this problem in the future.

Syngas samples for each waste mix were obtained after the system stabilized for at least 2 hours at steady state operation. Samples were obtained in certified pre-evacuated Summa containers for analysis at Wadsworth Labs. The results of the Wadsworth report are contained in Appendix A* to this report.

4.7.2 Syngas Components Analyzed

Each syngas sample was analyzed by Gas Chromatograph-Mass Spectrometer at Wadsworth Labs for a total of 35 compounds as shown in Table 4-2.

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^{*} Note that the Appendices to this report are included in a separate volume entitled, Rotary Kiln Gasification of Solid Waste for Base Camps: Appendices A-D.

Table 4-2. Compounds Analyzed in Syngas Samples.

		•	•			1111/
					HHV	LHV
			c .r.	Heat of	Heat of	Heat of
			Specific		Combustion	
Organic Compound	Formula	MW	Gravity	kJ/mol	BTU/scf	BTU/scf
Carbon Dioxide	CO ₂	44	1.52	0	0	0
Nitrogen	N ₂	28	0.97	0	0	0
Hydrogen	H ₂	2.016	0.069	290	326	274
Carbon Monoxide	CO	28.01	0.967	285	323	323
Methane	CH4	16.04	0.5543	890	1011	909
Ethane	C ₂ H ₆	30.07	1.05	1560	1791	1619
Propane	СзН8	44.09	1.56	2220	2582	2315
n-Butane	C4H10	58.12	2.07	2874	3365	3101
Propene	СзН6	42.08	1.4	1911	2332	2181
1,3-Butadiene	C4H6	54.09	1.9	2540	2933	2729
Isoprene	C5H8	68.12	2.35	3157	3580	3410
Acetone	СзН6О	58.08	2	1772	2006	1862
n-Hexane	C6H14	86.169	2.97	4202	4761	4404
Methyl Ethyl Ketone	C4H8O	72.11	2.5	2444	2786	2590
Cyclohexane	C6H12	84.16	2.98	3920	4563	4180
n-heptane	C7H16	100.2	3.45	4817	5452	5100
Benzene	C6H6	78.107	2.69	3315	3753	3591
Methylcyclohexane	C7H14	98.19	3.39	4565	5181	4200
Toluene	C7H8	92.132	3.176	3955	4482	4206
n-Nonane	C9H20	128.26	4.41	6125	6923	6494
Ethylbenzene	C8H10	106.17	3.66	4564	5172	4970
M,P-Xylene	C8H10	106.158	3.662	4559.8	5171	4956
O-Xylene	C8H10	106.158	3.662	4552	5162	4958
Styrene	C8H8	104.15	3.6	4394	4993	4830
Isopropylbenzene	C9H12	120.19	4.1	5260	5899	5661
n-Decane	C10H22	142.28	4.9	6778	7674	7190
n-Propylbenzene	C9H12	120.19	4.14	5260	5956	5661
1,3,5-Trimethylbenzene	C9H12	120.19	4.1	5241	5878	5584
1,2,4-Trimethylbenzene	C9H12	120.19	4.15	5195	5897	5602
d-Limonene	C10H16	136.24	4.7	6167	6994	6644
p-Isopropyltoluene	C10H14	134.22	4.62	5860	6631	6300
1,2,3-Trimethylbenzene	C9H12	120.19	4.15	5198	5900	5605
n-Undecane	C11H24	156.3	5.4	7429	8438	7846
n-Dodecane	C12H26	170.3	5.96	7901	9090	8650
Naphthalene	C10H8	128.2	4.421	5156	5845	5552

4.7.3 Syngas Chemistry – Executive Summary of Results

Figure 4-1 shows the average syngas chemistry broken down into flammable component groups as follows:

- 1. Traditional Syngas Mixture of hydrogen, carbon monoxide, and methane.
- 2. Gas Phase Grouping of gaseous C2 through C4 organics at standard conditions.
- 3. Gasoline Range Grouping of liquid C5 through C9 organics at standard conditions.
- 4. Diesel Range Grouping of liquid C10 and higher organics at standard conditions.

Figure 4-1 shows the dry syngas energy distribution of each flammable component group contributes to the total energy within the syngas mixture. The total energy of non-traditional

syngas components (C2 and higher) contributed more than 65% of the total energy within the gas sample. The data validates the theory C2 through C4 gaseous organics and C5+ liquid organics significantly enrich the energy content of the syngas. Gasoline and diesel range liquids evaporate into the syngas as vapor in the form of organic humidity.

Figure 4-2 shows the average dry heating value for each waste mix tested. The HHV is the gross energy (BTU per standard cubic foot) recovered if the water vapor from the hydrogen component portion is fully condensed within the exhaust. The low heating value is the net energy recovered if the exhaust remains hot, preventing the recovery of latent heat from condensing water vapor. The low heating value is used for all engine calculations, since the water vapor in the exhaust is not condensed.

Figure 4-3 shows the heating value of each waste mix as a percentage of natural gas. Table 4-3 summarizes the syngas mixtures tested at Wadsworth Labs.

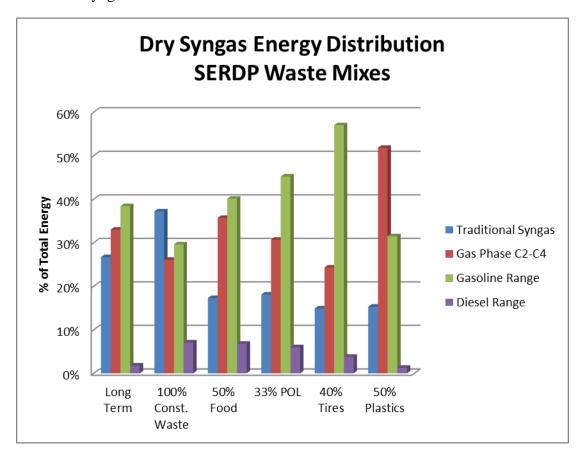


Figure 4-1. Energy Contribution from Organic Groupings.

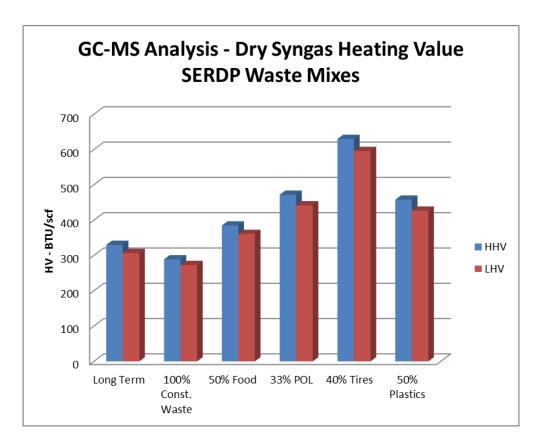


Figure 4-2. Average Dry Heating Value for Each Waste Mix.

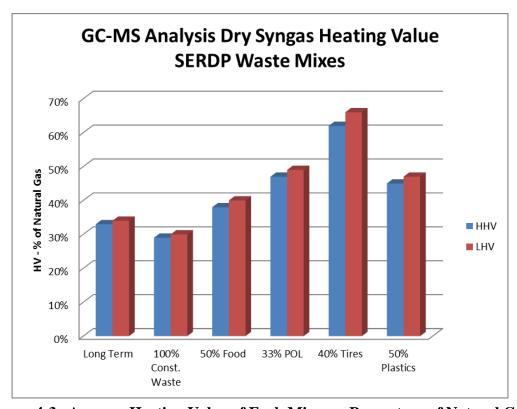


Figure 4-3. Average Heating Value of Each Mix as a Percentage of Natural Gas.

Table 4-3. Summary of Syngas Samples.

Long	Long	Long	100%	100%	100%	20%	20%	20%	33%	33%	33%	40%	40%	40%	20%
Ĕ	Term	Term	Constr.	Constr.	Constr.	Food	Food	Food	POL	POL	POL	Tire	Tire	Tire	Plastics
_	Mix #2	AVG	Mix #1	Mix #2	AVG	Mix #1	Mix #2	AVG	Mix #1	Mix #2	AVG	Mix #1	Mix #2	AVG	Mix #1
361	298	330	353	225	289	351	418	385	357	287	472	209	653	630	458
36%	73%	33%	32%	75%	29%	32%	41%	38%	32%	28%	47%	%09	64%	62%	45%
339	275	307	332	213	273	329	392	361	336	547	442	574	617	296	427
37%	30%	34%	37%	23%	30%	36%	43%	40%	37%	%09	49%	%89	%89	%99	47%
2.69%	7.23%	6.5%	5.72%	8.33%	7.0%	4.37%	5.08%	4.7%	6.24%	4.50%	5.4%	2.93%	2.74%	2.8%	3.34%
18.46%	22.08%	20.3%	21.90%	38.51%	30.2%	14.43%	10.75%	12.6%	15.73%	9.82%	12.8%	11.94%	12.16%	12.1%	11.94%
5.45%	7.22%	6.3%	2.64%	4.38%	3.5%	4.89%	6.51%	5.7%	3.11%	13.13%	8.1%	3.72%	1.81%	2.8%	9.82%
27.86%	15.83%	21.8%	21.31%	12.90%	17.1%	21.23%	23.70%	22.5%	10.99%	18.09%	14.5%	8.42%	23.29%	15.9%	30.43%
5.31%	4.36%	4.8%	%59'9	4.28%	5.5%	7.07%	8.07%	7.6%	5.92%	10.08%	8.0%	6.47%	4.89%	5.7%	11.59%
12.61%	3.98%	8.3%	2.70%	2.53%	4.1%	7.70%	14.42%	11.1%	23.75%	17.09%	20.4%	30.85%	31.41%	31.1%	13.82%
18.01%	10.90%	14.5%	12.19%	8.45%	10.3%	18.77%	9.39%	14.1%	7.65%	12.81%	10.2%	10.37%	6.90%	8.6%	13.84%
4.30%	16.46%	10.4%	5.00%	4.37%	4.7%	5.38%	4.29%	4.8%	3.68%	3.77%	3.7%	6.24%	4.22%	5.2%	2.47%
1.01%	6.67%	3.8%	3.22%	6.46%	4.8%	3.62%	9.64%	%9 :9	3.16%	4.07%	3.6%	7.65%	7.08%	7.4%	0.58%
0.70%	2.21%	1.5%	7.58%	3.77%	5.7%	3.82%	3.18%	3.5%	12.05%	2.37%	7.2%	7.27%	2.04%	4.7%	0.82%
0.50%	2.46%	1.5%	2.98%	3.75%	4.9%	5.58%	4.15%	4.9%	5.12%	3.24%	4.2%	2.80%	2.42%	2.6%	0.91%
0.07%	0.48%	0.3%	1.83%	1.91%	1.9%	2.73%	0.67%	1.7%	2.32%	0.88%	1.6%	1.13%	0.90%	1.0%	0.31%
0.02%	0.13%	0.1%	0.27%	0.35%	0.3%	0.41%	0.14%	0.3%	0.27%	0.15%	0.2%	0.21%	0.14%	0.2%	0.13%
100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
24.1%	29.3%	26.7%	27.6%	46.8%	37.2%	18.8%	15.8%	17.3%	22.0%	14.3%	18.1%	14.9%	14.9%	14.9%	15.3%
38.6%	27.4%	33.0%	30.6%	21.6%	26.1%	33.2%	38.3%	35.7%	20.0%	41.3%	30.7%	18.6%	30.0%	24.3%	51.8%
36.64%	40.22%	38.4%	33.68%	25.59%	29.6%	39.29%	40.94%	40.1%	50.29%	40.11%	45.2%	62.38%	51.65%	27.0%	31.53%
0.59%	3.07%	1.8%	8.09%	6.02%	7.1%	8.73%	4.96%	%8.9	7.72%	4.27%	%0.9	4.14%	3.46%	3.8%	1.34%

4.7.4 Results from Waste Mixes

Figures 4-4 to 4-14 show the percent of energy each group contributes to the syngas sample. The sum of these groups equal 100%. The majority of energy in the plastic mix was from gaseous phase components, indicating polyethylene breaks down to ethylene, polypropylene breaks down to propylene, etc. These gases may be further cracked or reformed into other hydrocarbons due to the presence of free hydrogen.

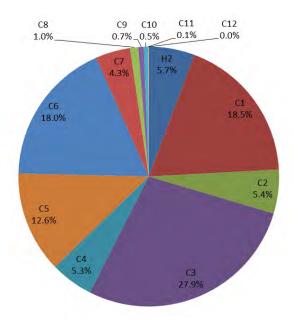


Figure 4-4. Percent of Energy in Syngas Sample Standard Mix #1.

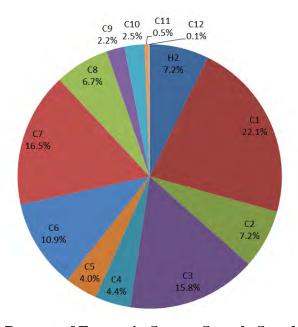


Figure 4-5. Percent of Energy in Syngas Sample Standard Mix #2.

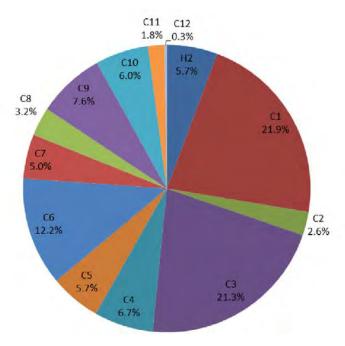


Figure 4-6. Percent of Energy in Syngas Sample 100% Construction Mix #1.

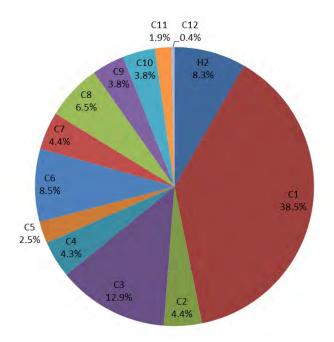


Figure 4-7. Percent of Energy in Syngas Sample 100% Construction Mix #2.

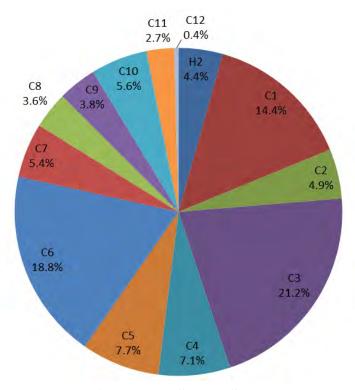


Figure 4-8. Percent of Energy in Syngas Sample 50% Food Mix #1.

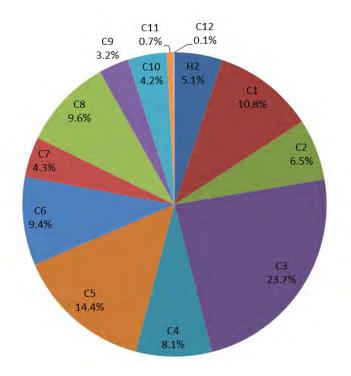


Figure 4-9. Percent of Energy in Syngas Sample 50% Food Mix #2.

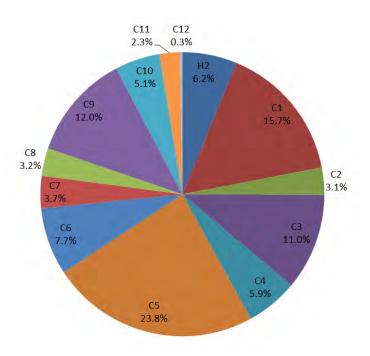


Figure 4-10. Percent of Energy in Syngas Sample 33% POL Mix #1.

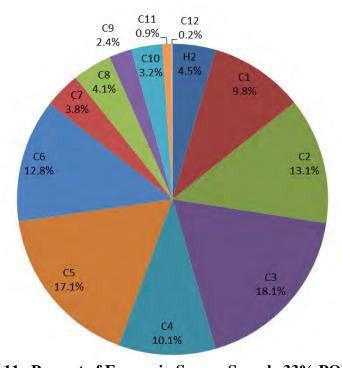


Figure 4-11. Percent of Energy in Syngas Sample 33% POL Mix #2.

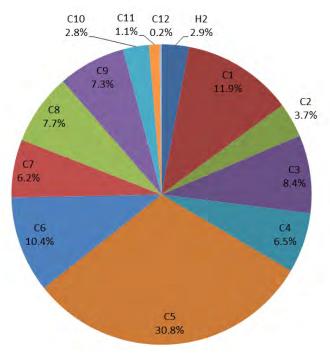


Figure 4-12. Percent of Energy in Syngas Sample 40% Tire Mix #1.

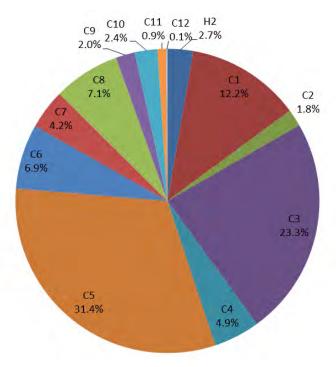


Figure 4-13. Percent of Energy in Syngas Sample 40% Tire Mix #2.

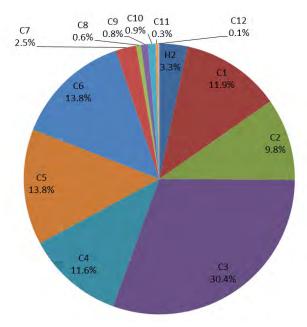


Figure 4-14. Percent of Energy in Syngas Sample 50% Plastics Mix #1.

4.7.5 Sampling of Residual By-products

There are four types of residuals generated as a by-product of the gasification process:

- Ash that is periodically removed from the main reactor
- Ouencher oil
- Condensate which is generated through cooling hot syngas
- Polisher fluid (ethylene glycol and water)

Of these four, ash is the only inevitable, recurring residue – the inorganics in the waste stream become ash. Quencher oil begins as standard petroleum motor oil, but then becomes replaced over time by pyrolysis oils produced in the reactor. The pyro oils continue to perform tar removal from the syngas. Therefore the quencher oil would be replaced only when doing significant maintenance, and not routinely. Researchers determined that condensate can be eliminated by carefully managing system heat transfer to vaporize it, although it might be produced in transitory phases. Finally, the polisher (secondary scrubber) will occasionally have to be changed as it saturates with light fraction tars that get past the quencher.

Samples of each of these materials were sent to commercial labs to measure metals in the ash, and organics in the other three. The full analytical reports are attached as Appendixes B and C. Table 4-4 gives only the detects for Resource Conservation and Recovery Act (RCRA) total metals in four ash samples. Table 4-5 shows Toxicity Characteristic Leaching Procedure (TCLP) metals results for those same samples. Only three metals were detected via TCLP extraction, and these values were orders of magnitude below the limits for characteristic hazardous waste determination: Ba limit is 100 mg/l; Cr = 5 mg/l; and Pb = 5 mg/l.

Table 4-6 shows concentrations of selected Polycyclic Aromatic Hydrocarbons (PAHs) in the oil quench tank. These higher concentrations are expected because this is where almost all the

pyrolysis oils accumulate. As these oils accumulate, they are fed back into the gasifier for cracking.

Table 4-7 shows concentrations of BTEX compounds and total PAH in the polisher fluid. BTEX was selected because it was expected that lighter fraction organics would end up in this fluid. Note that the units for PAH concentration are three orders of magnitude lower than in the quencher oil

Table 4-8 shows concentrations of BTEX compounds and total PAH in condensate.

4.8 Thermodynamics Discussion

4.8.1 Syngas Condensate

The original design concept was to prevent the water-gas and water shift chemical reactions within Rotary Gasifier RG-103. The intent was to force all of the moisture entering the reactor with the feedstock to exit the reactor as superheated steam mixed with the syngas. Condenser C-107 cooled the gas as close to atmospheric temperature, essentially condensing 95% of the moisture in the syngas. This condensate was captured in condensate separator CS-108.

The original design concept works exactly as intended, but the following observations occurred:

- 1. The condensate water contained a high level of highly volatile "clean" (clear slight yellow color) organic liquids, which have a high vapor pressure and a strong odor.
- 2. The condensate water would separate in the wastewater tank after draining from the system. The top layer was highly flammable, with flammability similar to gasoline.
- 3. The condensate takes months to fully vaporize volatile organic compounds.

Researchers felt intentionally condensing this liquid creates a disposal problem and is not desirable.

To avoid creating this condensate, researchers were able to minimize condensate by reducing the speed of hydraulic motor M-4, which drives the cooling fan on condenser C-107. Heat exchanger HE-115 was added to heat the polishing liquid to the same temperature as the condenser discharge temperature. Excess liquid condensate was transferred into quencher QC-104.

Table 4-4. Total RCRA Metals in Ash.

Sample Date	Waste Feed	Sample ID	As (mg/ kg)	Ba (mg/ kg)	Cd (mg/ kg)	Cr (mg/ kg)	Ag (mg/ kg)	Pb (mg/ kg)	Se (mg/ kg)	Hg (mg/ kg)
4-Feb-2015	Long Term Mix	A-01-020415-1600	3.6	382	0.065	663	0.21	0.7	nd	nd
19-Mar-2015	Long Term Mix	A-01-031915-1600	3.3	350	nd	636	0.15	0.76	0.44	nd
2-Apr-2015	Constr. Mix	A-01-040215-1505	3.3	517	0.042	337	0.12	1.0	nd	nd
8-May-2015	Long Term Mix	A-01-050815-1600	1.9	351	nd	197	0.11	2.5	nd	0.011

Table 4-5. TCLP RCRA Metals in Ash.

Sample Date	Waste Feed	Sample ID	Ba (mg/l)	Cr (mg/l)	Pb (mg/l)
4-Feb-2015	Long Term Mix	A-01-020415-1600	3.2	nd	0.0040
19-Mar-2015	Long Term Mix	A-01-031915-1600	1.9	0.029	nd
2-Apr-2015	Construction Mix	A-01-040215-1505	3.7	0.015	0.0040
8-May-2015	Long Term Mix	A-01-050815-1600	3.8	nd	0.0074

Table 4-6. Selected PAH Concentration in Quencher Oil.

Waste Feed Type	Sample ID	Acenapthylene (mg/kg)	Fluoranthene (mg/kg)	Fluorene (mg/kg)	Naphthalene (mg/kg)	Phenanthrene (mg/kg)	Pyrene (mg/kg)	Total PAH (mg/kg)
Long Term Mix	OS-01-101514-0910	470	190	300	1,200		200	2,360
40% Tires Mix	OS-01-031815-1530	930	400	770	2,300	270	560	5,660
33% POL Mix	OS-01-042415-1600	1,400	410	590	3,600	1,200	580	8,856
Long Term Mix	OS-01-042815-1600	610	270	420	1,100		450	3,070
Long Term Mix	OS-01-050715-1630	980	610	590	1,200	410	750	4,830

Table 4-7. BTEX and PAH Concentrations in Polisher Fluid.

			Benzene		Ethylbenzene	m,p-Xylene	BTEX total	Total PAH
Sample date	Waste feed type	Sample ID	(μg/I)	Toluene (µg/l)	(μg/I)	(μg/l)	(μg/l)	(μg/I)
8-Oct-2014	Long Term Mix	P-01-100814-1120	18				18	
15-Oct-2014	Long Term Mix	P-01-101514-0910						20
22-Jan-2015	Long Term Mix	P-01-012215-0948	160	7.9		6.8	175	
30-Jan-2015	Long Term Mix	P-01-013015-0915						1,837
5-Mar-2015	50% Plastics Mix	P-01-030515-1557						160
13-Mar-2015	33% POL Mix	P-01-031315-1531	2,400	260		110	2,770	
1-Apr-2015	Long Term Mix	P-01-040115-1600	14,000	5,500	3,700	7,700	30,900	
6-May-2015	Long Term Mix	P-01-050615-1552	1,400	120		50	1,570	
13-May-2015	Long Term Mix	P-01-051315-1530						28

Table 4-8. BTEX and PAH Concentrations in Condensate.

4-56	Sample Date	Waste Feed Type	Sample ID	Benzene (µg/l)	Toluene (µg/l)	Ethylbenzene (µg/l)	m,p-Xylene (μg/l)	o-Xylene (μg/l)	BTEX, total (μg/l)	PAH total (μg/l)
	15-Oct-2014	Long Term Mix	WW-01-101514-1120	320	11				331	
	5-Mar-2015	50% Plastics Mix	WW-01-030515-1352							15
	5-Mar-2015	50% Plastics Mix	WW-02-030515-1557							34
	13-Mar-2015	33% POL Mix	WW-01-031315-1531	12	1.4			3.7	17	
	19-Mar-2015	Long Term Mix	WW-01-031915-1600	1,500	240		75		1,815	
	14-Apr-2015	40% Tires Mix	WW-01-041415-1640	1,800	890	450	300		3,440	
	28-Apr-2015	Long Term Mix	WW-01-042815-1600							1,917
	6-May-2015	Long Term Mix	WW-01-050615-1552	1,900	1,400	890	2,200		6,390	
	7-May-2015	Long Term Mix	WW-01-050715-1600							2,188
	20-May-2015	Long Term Mix	WW-01-052015-1500	670	87		55	160	972	

The following observations were the result of this change:

- 1. The cooling fan on cooler C-107 provides cooling to both the condenser and the main hydraulic drive system. Excessive slowing of the fan speed caused the hydraulic oil to overheat at temperatures above 135 °F.
- 2. The cooling fan on C-107 was reversed, to force heat from the hydraulic cooler into the condenser. This had a significant positive result on temperatures, but the fan vibrated excessively at certain speeds, limiting functionality.
- 3. Transferring condensate water from condensate tank CT-114 to quencher QC-104, allows water to form an emulsion with the pyrolysis oil. Reflux metering pump MP-117 doses this emulsion back into Rotary Gasifier RG-103 for reprocessing.
- 4. Organics mixed with the water either crack into hydrocarbon chains or vaporize into the syngas.
- 5. A portion of the water in the reflux cracks into hydrocarbons by the water-gas and water shift reactions. Additional thermal energy to sustain these reactions is provided by liquid organics (pyrolysis oil) partially burning with air in the burning char layer at 2200 °F.
- 6. Unreacted water exits as superheated steam.
- 7. All of the water in the feedstock can be processed without the formation of condensate when controlling the temperatures properly.
- 8. Additional condensate water from previous tests was pumped into quencher QC-104 for processing and disposal by thermal cracking. Numerous tests were conducted where there was negative condensate production from this practice.

Not all of the condensate water is cracked within the reactor, requiring excessive evaporation of this moisture into the syngas flow stream. The syngas exiting polisher separator PS-110 is saturated at the temperature of the polisher liquid. Heat exchanger HE-115 heated the polisher liquid to force the desired evaporation rate to maintain a net zero or negative condensate production rate. Excess condensate accumulated in condensate tank CT-114 due to the mechanical limitations of the system and was drained only when absolutely required.

Gas reheater RH-111 increases the temperature of the gas by 10 to 15 °F using heat from the engines cooling system. Adding heat locks the water vapor in the form of relative humidity. Condensation will not occur unless the gas temperature cools in downstream piping by 10 to 15 °F.

4.8.2 Dial-In Heating Value Adjustment

Metering pump MP-117 is infinitely adjustable up to the maximum operating speed. The heating value of the gas may be enriched by increasing the speed of the metering pump allowing additional flow of reflux into gasifier RG-103. The operators normally adjust the speed of the pump to maintain a constant liquid level in quencher QC-104. All of the oil condensed in Quencher QC-104 and some of the liquid water added from condensate tank CT-114 enters the reactor to be cracked into additional hydrocarbons. Adjusting the metering pump speed up or down allows the regulation of the heating value of the gas entering the engine.

4.8.3 Volume and Heating Value Adjustment

The HHV represents the gross energy in the syngas mixture. The heating value calculated from the GC-MS analysis was on a dry gas basis. Moisture creates numerous thermal loads in combustion, which reflects by the adjusted low heating value (LHV). The presence of water vapor creates the following issues:

- 1. Water vapor passes through the engine and discharges to atmosphere as a gas in the exhaust, displacing combustion air.
- 2. The density of water vapor is about half of syngas, small amounts of water vapor (by mass) greatly dilute the syngas mixture by volume.
- 3. Although latent heat of vaporization was added when evaporating this moisture into the syngas, the latent energy is not recovered in combustion since the engine exhaust discharges to atmosphere at high temperatures, preventing energy recovery by condensing (zero energy net gain or loss).
- 4. The combustion energy required to superheat the water vapor up to the combustion temperature creates an additional heat loss in the reactor.
- 5. Hydrogen (free or locked up in hydrocarbons) oxidizes to water vapor, where latent heat is not recovered.

Flow orifice FO-112 measures the mass flow of the mixture of syngas and water vapor entering the engine. Figure 4-15 represents a simplified method to adjust the heating value of the syngas (adjusted LHV) to compensate for the presence of water in the syngas mixture.

A psychrometric chart estimates the moisture content in the syngas on a mass basis. For example, if the temperature at TE-105 is 115 °F, the moisture content of the syngas on a mass basis is 07% (0.07 lbs of water per pound of syngas). Use Figure 4-15 to estimate the adjusted LHV due to the presence of water vapor in the syngas mixture. The adjusted LHV for the standard term mix would be 250 BTU/scf.

The gas flow measured by flow orifice FO-112 includes both water vapor and syngas. If the flow was measured to be 22 SCFM, the net adjusted gaseous fueling rate (LHV) entering the engine would be 250 BTU/scf * 22 SCFM * 60 min/hr = 330,000 BTU/hr.

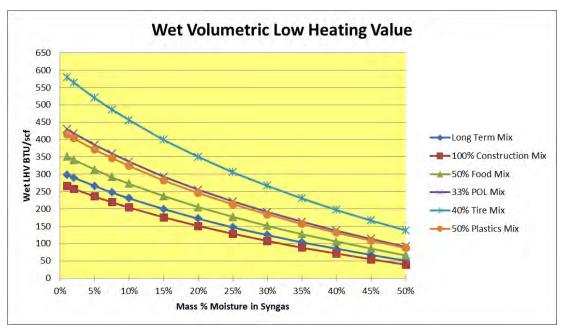


Figure 4-15. Moisture vs. Heating Value.

4.8.4 Loss of Thermodynamic Efficiency of Engine

Feeding syngas into the diesel engine results in a loss of thermodynamic efficiency as the engine transitions from a Diesel thermodynamic cycle to an Otto cycle with increasing gaseous fueling rate. Figure 4-16 estimates the loss in thermodynamic efficiency based on the gaseous fueling rate.

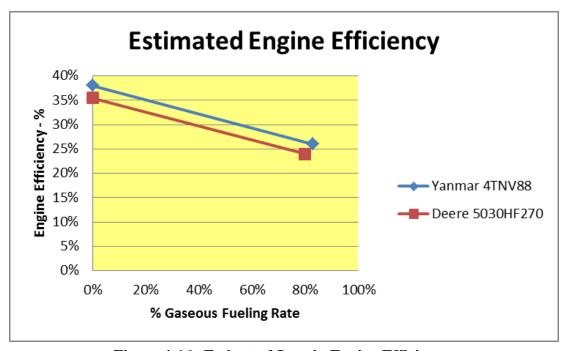


Figure 4-16. Estimated Loss in Engine Efficiency.

4.8.5 Thermodynamic Energy Balance Around Engine

Figure 4-17 shows the energy flow through the entire system.

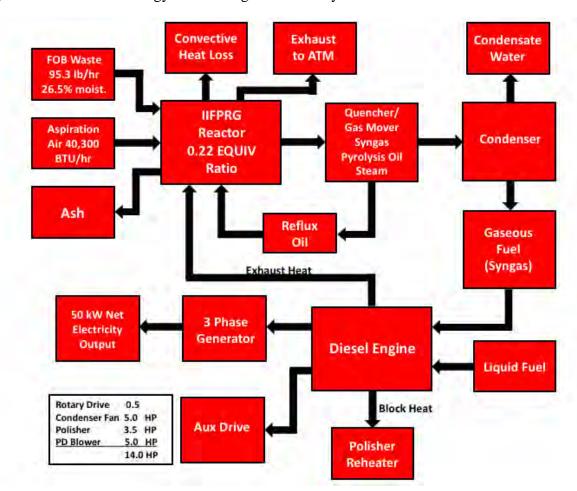


Figure 4-17. Energy Flow through the Entire System.

5. Development of the IIFPRG

The rotary gasifier (IIFPRG) uniquely combines the positive features of cross draft, updraft, downdraft, and indirect pyrolysis gasifiers into a single rotating unit. The gasifier is designed to process mixed and unsorted feedstock that can be dripping wet. Large inert items must be removed, but smaller inert items such as cans, glass, metals, soil, etc. simply pass through the gasifier and discharge with the ash.

The IIFPRG is designed to process plastics that have a low melting temperature, with little or no fixed carbon. The gasifier is not designed to operate on 100% plastics. Plastics must be mixed with other wastes to provide sufficient fixed carbon to sustain operation. The same issue applies when gasifying volatile liquids such as motor pool lubricants.

The gasifier rotates, causing a tumbling action that continually exposes fresh feedstock to the thermal reaction zone. This prevents clogging and passes inert materials out of the process. The design of the ram style feed system provides 70,000 lbs of hydraulic pushing force (up to 2,800 psi contact stress) to feed wastes into the gasifier without the blockages.

SUNY Cobleskill developed and engineered a complete trailer-mounted IIFPRG system to convert solid feedstock to electricity. The feedstock handling system delivers feedstock into the rotary gasifier and consists of a super-compression dewatering ram. The IIFPRG gasifier vessel, piping, and process components are constructed of carbon steel due to budget limitations (ideally, stainless steel would be used on a deployable system). The gas cleaning system consists of a unique oil based wet scrubber, an oil separator, a gas cooler/condenser, a condensate separator, and a gas reheater. The gas moving system consists of a variable speed positive displacement rotary lobe blower to deliver pressurized gas to either a combustion flare or to a 60 kW diesel engine-driven generator. The generator engine was slightly modified to allow the introduction of synthetic fuel gas (syngas) with the intake air.

5.1 Engineering of the IIFPRG

Researchers engineered the trailer-mounted IIFPRG prototype from January through April 2013. The following features were incorporated into the design:

- 1. The entire gasifier system fits on an 8 x 20-ft trailer.
- 2. The ram feed system compresses, densifies, and mechanically dewaters feedstock to less than 50% moisture content by squeezing in a one step process.
- 5. The outer fixed shell around the gasifier indirectly transfers heat from diesel engine exhaust into the rotating gasifier vessel.
- 6. The system maintains a 22-degree inclination angle based on AutoCAD layouts of the gasifier internals, char bed depth, and tumbling angle of repose.
- 7. The system uses refractory firebrick at the burning char zone (downhill end).
- 8. Thermodynamic heat balance ensures enough thermal energy exists to dry wet feedstock and fully volatilize within the gasifier.
- 9. The cyclone captures particulates from the syngas stream.
- 10. The water seal in the bottom of cyclone relieves any upset overpressure condition.
- 11. The all-in-one jet scrubber:

- a. Cleans syngas of tars and particulates to allow use in an engine.
- b. Fills with used motor pool lubricants.
- c. Maintains fluid temperature of 220 °F to prevent steam from condensing out of the syngas.
- d. Quenches syngas from > 800 °F to 210 °F.
- e. Provides a liquid seal for flashback prevention and extinguish flaming fly embers (safety).
- f. Cleans gas by high momentum exchange jet scrubbing using high pressure oil at 1,500 psi.
- g. Incorporates internal recirculation to allow syngas to be cleaned multiple times before leaving vessel.
- h. Gasifies spent scrubbing oil with feedstock.
- 12. Aspiration is forced by using positive displacement gas pump (rotary lobe blower) to deliver syngas to the engine without loss of engine power or efficiency.
- 13. All equipment is mechanically driven using hydraulic motors powered by the front power take off available on John Deere generator engines.
- 14. The three stage sandwich cooler is configured as follows:
 - d. The (air intake) condenser cools syngas to within 20 °F of the ambient temperature to condense steam and lower dewpoint of the syngas.
 - e. The hydraulic cooler cools hydraulic drive oil to less than 140 °F.
 - f. The scrubbing oil cooler (fan with air discharge) cools scrubbing oil to 210 °F.
- 15. The gas reheater uses scrubbing oil heat to raise the syngas temperature 20 °F higher than the dewpoint (which lowers relative humidity to about 50%).
- 16. The system uses a 60 kW diesel engine-driven generator with the ability to accurately monitor liquid fuel usage.
- 17. The system employs a 0 to 60 kW load center to electrically load the diesel engine-driven generator at various loads.

5.2 Compression Dewatering

A student intern was assigned to research the ability to dewater various wastes using supercompression. Sixteen wastes were collected from the campus and analyzed for bulk density, moisture content, and proximate analysis.

Feedstocks with dramatic differences in physical properties were selected for compression dewatering. Water was added to each feedstock to obtain a moisture content of 80% (wet basis, 80% water, 20% solids). A modified hydraulic shop press was used to compress each feedstock using a piston / die. Various compressive stresses were tested to evaluate how much water could be mechanically removed. The results of this test are reported separately in Section 5.2.

In summary, all of the feedstock types tested were mechanically dewatered to less than 50% moisture content (wet basis) at 1,800 psi compressive stress. Increasing the compressive stress to 4,000 psi only lowered the moisture content to less than 42%. Increasing further to 8,000 psi only lowered the moisture content to less than 38%.

Researchers decided to target a compressive stress of 1,800 psi to mechanically reduce the feedstock moisture content to less than 50% when entering the gasifier.

5.3 Gasification System Fabrication and Cold Testing

Fabrication of the complete trailer-mounted gasification system began in January 2013 and was completed in early May 2013 (Figure 5-1). Cold testing was conducted throughout the month of May, where numerous mechanical issues were identified and corrected. The scrubber (SC-105) was modified to incorporate a washed packed bed design developed by USMA Cadets. The USMA design used rolled stainless steel mesh as packing and vegetable oil as the wash liquid. Scrubber SC-105 was then filled with used cooking (vegetable) oil and fully tested at various gas flows up to the full design flow of 85 SCFM. Note: used cooking oil was replaced with used crankcase oil during hot testing in July 2013.

The entire gasification system is hydraulically powered using a hydraulic gear pump that is driven by a separate mechanical power take off located on the front end of the diesel engine. All hydraulic driven equipment immediately stops rotating when the generator stops.



Figure 5-1. Gasifier Trailer during Fabrication.

The hydraulic system was fully commissioned during cold testing. Motors are controlled using 24 VDC dual coil hydraulic solenoid valves. Researchers found that the wrong hydraulic pump mount was provided on the engine block power take off, forcing the use of a gear pump that was 50% smaller than design. Budget limitations forced the following approach:

- 1. Positive displacement blower PDB-201 had to be electrically driven with a 3-phase variable speed drive. The blower was removed from scrubber SC-105 outlet and located on the ground about 75 ft from the gasifier trailer.
- 2. The hydraulic ram feeder RF-102 had to be powered by a separate gasoline engine.

Special hydraulic motors were purchased with high pressure seals that do not require case drains to relieve shaft seal pressure (when the system is designed with low hydraulic return pressure). All of the shaft seals began to leak within a few hours of cold testing, requiring the installation of separate case drains for all hydraulic motors and pumps. The seals were replaced on all of the hydraulic motors and pumps. The system was tested extensively after the installation of case drains and all seal failure problems were resolved before hot testing.

5.4 Feedstock Handling System

The feedstock handling system was constructed using a repurposed 35 ton hydraulic log splitter. The design had numerous problems that occurred during hot testing, forcing various mechanical changes. All problems have been resolved and the feedstock handling system currently works reliably as originally designed. Note that the feed system is driven by a small, external gasoline engine. This was done for expedience while testing. In a production version, the compression ram would be powered from the main system hydraulic pump.

The compression section was fabricated using a 6 x 6 x 24-in. stroke ram. Figure 5-2 shows the compression chamber and the end of the ram piston. Figure 5-3 shows the fabricated stainless steel feedstock hopper. Figure 5-4 shows the fabricated joint that is used to attach the hydraulic cylinder to the feedstock ram. A two-stage hydraulic pump (16:4 GPM) drives a 5-in. hydraulic cylinder. The ram is capable of pushing feedstock at a force of 70,000 lbs into the gasifier.



Figure 5-2. Six-in. Hydraulic Ram Piston and Compression Chamber.



Figure 5-3. Feedstock Hopper.



Figure 5-4. Thirty-Five Ton Feedstock Ram.

Originally, the ram was mounted at a 7-degree angle to allow feedstock water to freely drain by gravity as wet feedstock is compressed. This configuration required a 15-degree miter joint

(Figure 5-5), which became a significant problem during testing. Severe feedstock jamming occurred at the miter joint. This design was abandoned about a month into hot testing. The miter was eliminated and the feedstock system was mounted at the same inclination angle as the gasifier. Feedstock pushed directly straight up into the gasifier feed tube.



Figure 5-5. Miter Joint.

5.5 Feedstock Dewatering

A test was conducted in Sept. 2013 to determine if the ram feeder is able to dewater feedstock from 80% moisture content to less than 50% moisture content. A synthetic waste blend of dripping wet mixed paper and plastic at 80% was fed into the gasifier. Significant amounts of moisture was squeezed from the feedstock and drained. The moisture content was reduced to less than 50%. The system worked as designed and intended. Dewatering was also observed anytime when handling feedstock that has over 50% moisture content. Liquids freely drained from the compression chamber when processing dripping wet cafeteria waste.

Subsequent testing will focus on the effectiveness of feedstock dewatering using supercompression. Each feedstock will be tested using the ram feeder to determine moisture removal. Water will be captured and measured. Samples will be obtained and analyzed for moisture content by loss in weight. Data will be reported for each feedstock.

5.6 Hot Testing of the IIFPRG

Extensive hot testing commenced on 6 June 2013 and continued through 8 August 2013. Numerous technical problems occurred, preventing the system from operating at any level of steady state conditions. Each problem was addressed as it occurred. Numerous tests were attempted during this timeframe. Each test had a significant process or mechanical problem, preventing the system from ever reaching the steady state conditions necessary to obtain adequate data to meet project objectives.

Data was recorded for the majority of runs during the hot testing period. All available resources were dedicated to troubleshooting problems and ensuring safe operating conditions for the researchers working on the equipment.

The main problems experienced during hot testing were:

- 1. Rotary gasifier drive jamming and breakage
- 2. Overfilling the gasifier with feedstock
- 3. Nonflammable syngas at the flare
- 4. Feedstock jamming in the feed pipe.

5.6.1 Overfilling the Gasifier with Feedstock

5.6.1.1 Resulting Problems

The low inclination angle (22 degrees above horizontal) of the gasifier vessel did not allow unreacted feedstock to properly tumble downhill and adequately fill the reactor vessel. Excessive unreacted feedstock accumulated on the uphill end of the rotary vessel, consistently covering the gas exit point. The slightest amount of overfeeding caused the gas exit pipe to plug with unreacted feedstock, resulting in excessive vacuum within the downstream equipment. Blockages required the gasifier to be emptied and completely disassembled. Blockages of the syngas exit piping occurred almost every time the gasifier was operated.



Figure 5-6. Rotary Chain Drive.

Excessive vacuum sucked the safety water seal located on the bottom of the cyclone into the scrubber vessel, creating a dangerous situation by allowing air to enter the system. The water seal was replaced with a blank flange to correct this safety issue.

The gasifier required blind operation. Feedstock level within the gasifier vessel was impossible to determine. A magnetic material level sensor was developed to monitor feedstock level from the uphill end. This device was complicated, provided false indications, and promoted overfilling problems.

5.6.1.2 Attempted Corrective Action

The location of the gas exit port was moved to the furthest top uphill location. Three different port geometries (Figure 5-7) were fabricated and tested to force gas removal at the far uphill corner of the gasifier at the lowest gas velocity possible at the entrance point. A helical lifter (Figure 5-8) was added to help push unreacted feedstock downhill in the cylindrical reactor vessel. The helical lifter plate caused excessively high torque and jamming problems. These modifications did little to correct the problems.



Figure 5-7. Various Syngas Exit Nozzle Geometries Tested.



Figure 5-8. Helical Lifter Uphill of Brick.

5.6.2 Gas Burning Within the Gasifier Vessel

5.6.2.1 Resulting Problems

Air leakage into the reactor vessel caused a portion of the flammable gas generated to burn before exiting the reactor vessel. The flammability of the gas at the flare was weak or in most cases not flammable. Syngas samples were taken only when observing the highest levels of flammability in the combustion flare.

Air was observed to enter the reactor vessel through a rat-hole that formed at the top sector of the burning char bed between 10:00 and 2:00 o'clock positions. This "rat-hole" formed due to insufficient feedstock in the top portion of the rotary reactor that resulted from the low 22-degree inclination angle of the reactor vessel. Air was also observed to enter the reactor vessel and burn gas through the material feed pipe.

5.6.2.2 Attempted Corrective Action

Changing the inclination angle of the rotary vessel was a major modification and was not attempted during the summer hot testing period. Changing the rotational speed of the reactor vessel helped to control the rat-hole issue within the burning char bed. Speeds over 1 RPM quickly promoted the combustion of syngas within the gasifier vessel. The optimum speed was determined to be less than 0.5 RPM.

Various attempts to form an adequate char bed at startup were tested, which included wood char, charcoal, wood pellets, and anthracite coal. The use of this feedstock addressed the problem during startup, but the rat-holes returned after the initial charge was consumed. Using these materials for starting was not deemed practical for military applications. Other attempts including reversing the rotary drive direction multiple times per minute, increasing the rotational speed to 6 rpm, and adding a helical lifter to help move feedstock downhill did little to correct the problem.

5.6.3 Feedstock Jamming Within the Feed Pipe

Problems: Feedstock jammed within the feed pipe preventing the flow of fresh feedstock into the reactor vessel when using 70,000 lbs of pushing force. This was an ongoing problem throughout the summer hot testing period. The feedstock handling system worked fine when the system was cold, but consistently plugged when the system became hot.

The system was crashed stopped and opened to observe problems. Internals were inspected with a custom video camera. Large super-compressed briquettes (sausages) formed within the feed pipe and became rock hard with reactor heat. These briquettes created endless mechanical problems and did not readily gasify.

Blockages formed at the discharge end of the feed pipe at the uphill end of the gasifier. This caused a wedging action that progressively compacted the material for the entire length of the feed pipe. Blockages were nearly impossible to remove mechanically. Special tools were developed to allow boring and drilling to remove blockages. Hard blockages were also caused by the rubber sleeved pinch valve.

Attempted Corrective Action: Numerous tests were conducted on varying feedstock type, size, and preparation methods. Smaller amounts of feedstock per pushing cycle helped, but blockages remained a problem. A smaller ram and insert (5 x 5-in.) was fabricated to increase the pushing stress and to minimize compaction size. This change significantly helped, but blockages remained an ongoing problem. Both the ram and sleeve were modified numerous times with some positive effect.

A rubber sleeved pinch valve was installed to minimize air leakage through the material feed pipe. This rubber sleeve of this valve was partially burned as unreacted feedstock burned down the feed pipe overnight. The fire within the rubber sleeve caused the inside surface to become excessively rough. Feedstock continually jammed in the pinch valve regardless of the sleeve pressure, requiring the valve to be removed.

5.7 Corrective Action to the IIFPRG System in 2013

Significant ongoing problems occurred during early testing. Principal Investigator (Stephen Cosper) decided to stop all testing and execute a major corrective action plan to permanently resolve the ongoing problems.

The modifications consisted of:

- 1. Increase the inclination angle of the gasifier from 22 to 40 degrees (Figures 5-9 and 5-10).
- 2. Replace entire rotary gasifier drive with a torque tube line shaft drive, slip clutch, and all new gearboxes.
- 3. Modify the internals of the gasifier.
- 4. Shorten the feed pipe and inject feedstock directly into the reaction zone.
- 5. Install thermocouples at varying locations near the feedstock feed point to monitor the charge level within the gasifier.
- 6. Connect diesel exhaust to heat rotary shell. Insulate gasifier vessel to minimize heat losses.



Figure 5-9. Feedstock Handling System at 22-Degree Inclination.



Figure 5-10. Feedstock Handling System and Gasifier at 40-Degree Inclination.

5.7.1 Increase the Inclination Angle of the Rotary Gasifier from 22 to 40 Degrees

Researchers did full scale layouts of the rotary gasifier internals using AutoCAD to determine the optimum inclination. A minimum angle of 40 degrees was determined based on the desired char bed depth at the 12:00 position and the tumbling angle of repose. Increasing the angle above 45 degrees would reduce or even stop the tumbling action.

Hinges were added to the downhill end of the gasifier to allow the adjustment of the gasifier inclination angle. The angle was increased to 40 degrees, requiring reworking of the discharge piping and the feedstock handling system. Stabilizing jacks on the corners of the trailer allow further adjustment of the inclination angle from 36 to 44 degrees by tilting the entire trailer up to 4 degrees.

Increasing the angle resolved all problems with feedstock flow within the gasifier. The problem of "rat-hole" formation on the top segment of the burning char zone was resolved and feedstock freely tumbles downhill.

5.7.2 Replace the Rotary Gasifier Drive

The entire rotary gasifier drive and support platform was replaced with a line shaft drive. All chain drives were removed, eliminating the problems with excessive chain forces at high torque. The rotary gasifier was modified with a shaft drive to provide pure rotational torque free of dislodging forces (common to chain and gear drives).

Three new gearboxes were used to provide a drive reduction of 8750:1. The new drive allows the gasifier rotational speed to be varied from 0.15 to 0.5 RPM. An automatic slip clutch was added to limit the rotational torque on the rotary gasifier to 1,400 ft-lbs. A safety shear pin was added at the gasifier connection. All drive train components are rated for the maximum allowable drive torque. This change resolved all rotational drive problems. The rotational speed of the gasifier can be varied by simply adjusting the hydraulic flow control valve to hydraulic motor M-1

(Figure 5-11). The torque limiting clutch was adjusted and tested to slip as designed without damaging components.



Figure 5-11. Hydraulic Rotational Direct Drive.

5.7.3 Modify the Gasifier Internals

The downhill end of the gasifier was cut off using a plasma torch to expose the fire brick. Mortar was not used, allowing the top brick fall down and creating a path for air to leak behind the brick and burn syngas within the gasifier vessel (Figure 5-12). Researchers felt there was no way to reliably resolve this problem and all brick was removed from the gasifier. The internals of the gasifier were modified using fabrications to replace the function of the brick. Various major internal modifications were made to the gasifier during September 2013 to remove all pinch points that could raise torque, causing problems with gasifier rotation. The gasifier was welded closed and the fixed downhill spring plate was modified to control the path of combustion air flow. These changes were a success. All subsequent testing from 19 September provided high and consistent gas flammability without any sign of gasifier jamming or high drive torque conditions.

5.7.4 Shorten the Feed Pipe

The entire feed pipe assembly was modified. The feed pipe was shortened by 75%, which significantly reduced the distance feedstock must be pushed by the ram feeder. The feed nozzle was modified to force feedstock to the bottom half of the rotating gasifier vessel. This change eliminated the formation of rock hard briquettes within the feed pipe.

This change also resolved all feedstock blockage problems in the feedstock handling system and corrected the safety issue of air leakage into the gasifier with feedstock. Any air that leaks into the gasifier with the feedstock is consumed immediately by combustion. This change greatly increases the overall safety of the system. The use of nitrogen during startup was no longer required and the gasifier no longer puffs due to overpressure during operation.



Figure 5-12. Problem of Dropping Brick.

The design of the gas outlet pipe was also changed. All pinch points that could cause feedstock wedging were removed. Changes allowed feedstock to freely tumble without obstructions downhill within the gasifier. This change resolved all problems with high rotational torque that had been caused by feedstock jamming between the stationary pipe and rotating reactor vessel.

5.7.5 Install Thermocouple Wells on the Feed Pipe to Determine Charge Depth

Four thermocouple wells were added to the feed pipe monitor the level of feedstock charge at various points within the gasifier. These thermocouples provide a temperature profile to determine the level of feedstock charge within the gasifier. Fresh and drying feedstock drives the temperature to less than 230 °F. Thermocouples that read significantly less than the discharge temperature are covered by feedstock. Thermocouples that read similar to the discharge temperature are not covered with feedstock. This change allowed researchers to use instrumentation to determine the level of charge within the gasifier. All problems related to overfeeding the gasifier and plugging the syngas exit pipe with feedstock were resolved.

5.7.6 Connect Diesel Exhaust to Provide Indirect Heat to Rotating Gasifier Shell

The outer stationary gasifier shell was cut open to allow the use of a thermal imaging camera to evaluate the temperature profile on the gasifier shell (Figure 5-13). Lower than expected temperatures were observed. The cut-out was installed with hinges to allow the use of future thermal imaging. The door can be opened anytime during operation to obtain thermal images of the rotating shell. The entire gasifier was insulated with 2-in. of mineral wool insulation. The insulation was covered with stainless steel cladding (Figure 5-14). Piping was added to provide hot diesel exhaust to the outside of the rotary gasifier shell. Hot diesel exhaust enters the gasifier at 900 to 1000 °F and exits to atmosphere at about 500 °F (Figure 5-15). The conduction of heat indirectly through the gasifier shell provides substantial energy to dry wet feedstock. A significant performance improvement was observed with this change. A highly flammable gas

was produced within 15 minutes after lighting the gasifier. The gas flammability was consistent throughout the entire test.



Figure 5-13. Thermal Imaging Cut-Out on Stationary Outer Shell.



Figure 5-14. Gasifier Fully Insulated with Stainless Steel Cladding and 65-kW Generator, Exhaust Connected to Shell



Figure 5-15. Sixty-kW Generator Exhaust Connected to Gasifier.

5.8 Summary Operations after 16 September 2013

The modifications were completed and testing continued from 16 September through 21 November 2013. The system currently works as follows:

- 1. The use of nitrogen during startup is no longer required.
- 2. No safety issues or concerns have occurred.
- 3. The gasifier starts on any feedstock. No special starting stock is required.
- 4. The gasifier ignites with a hand torch (Figure 5-16). The torch flame is licked into the gasifier to ignite feedstock. A burning char bed naturally forms within 15 minutes.
- 5. Flammable syngas is observed within 15 minutes of ignition. The flare ignites and sustains combustion at the flare.
- 6. The combustion at the flare is consistent throughout the operation. The gas burns directly on the water, indicating sufficient heating value to operate an engine.
- 7. No noticeable change in syngas flammability at the flare throughout operation.
- 8. All feedstock handling problems have been resolved. The system has handled woodchips, , plastic, rubber, and cafeteria waste without any malfunction or technical problems.
- 9. The rotary drive operates reliably and all jamming problems are resolved.
- 10. All problems related to air leaking past the burning char zone ("rat-holes" and brick stability) and combusting syngas within the gasifier have been resolved.
- 11. Optimum performance occurs at a gasifier rotational speed of one rotation in 3 minutes.
- 12. The burning char bed consistently runs between 1,900 and 2,200 °F on the far downhill end of the gasifier.
- 13. The gasifier was able to process any feedstock fed into flammable gas without any technical problems. Feedstocks tested include dripping wet cafeteria waste, rubber, office paper, cardboard, catalogs, plastic bags, packaging, and pellets, mixed wood chips with excessive shavings and fines.



Figure 5-16. Lighting Gasifier with Hand Torch.

5.9 Permitting Issues

Currently the IIFPRG is operated at SUNY Cobleskill under a research and development (R&D) permit with the New York State Department of Environmental Conservation (NYDEC). In a

contingency environment, technically there are no environmental regulations or permitting relevant. However, the research team acknowledges that for longer scale testing and demonstration purposes in the Continental United States (CONUS), the gasifier will need to fall under the appropriate regulatory regime. The difficulty arises because small scale WTE and gasification systems are rare. Consequently, there are no clear cut regulatory definitions or categories that apply. Further, because the IIFPRG is unique, there is literally no precedent. Added to that, each state (and each potential site) would have different criteria (e.g., pollutant).

Therefore, to scope the environmental permitting likely to be required, the research team is taking the approach of figuring out what would be required to permit the gasifier for a demonstration in the state of New York, even though there are currently no plans to do so. Consultations with an NYDEC engineer on specific requirements are ongoing.

A permitted site would require solid waste handling and air pollution permits, possibly wastewater discharge permits. The waste and water permits should be pro-forma exercise, but the air permit will likely be the more challenging. The primary emission point will be the diesel engine exhaust.

An air permit in NY would incorporate NSPS rules for stationary internal combustion engines. A portable generator on a trailer becomes stationary if parked at the same location for more than 12 months. CFR Title 40, Part 60, Subpart IIII, Standards of performance for stationary compression ignition (diesel) internal combustion engines (CI ICE), requires that any modified engine subject to this subpart must meet the emission standards applicable to the model year, maximum engine power, and displacement. Therefore, the gasifier modified engine it must still meet the same specifications as the initial manufacturer.

As a point of reference, a commercial biomass gasifier in NY (154 MMBTU/hr turbine) was recently permitted. The emissions are regulated for PM, opacity, Cd, Pb, Hg, SO₂, HCl, dioxin/furan, NO_x, and CO. This is of course a very large stationary power generator. There were several emissions points, but the primary is the turbine output, which also is the same stack that exhausts the flare and startup boiler emissions.

6. CFD Modeling

6.1 Methodology

The goal of this work is to use CFD simulations as a tool that provides an insight into thermal and chemical conversion of waste as it travels through the gasifier and effect of hydrodynamics on these processes. Several species were considered as waste, wood chips at the beginning, and later on plastic (cafeteria waste). CFD analysis will be able to predict the syngas composition and temperature in rotating bed gasifier close to collected experimental data. The CFD model will help to understand the effect of operating parameters like pressure, temperature, flow rates, mixing, and waste content on syngas composition. Over the years, many such studies are published in the literature [1-8]. However they do not address large scale gasifiers, which require superior computational power due to the large amount of cells in the mesh.

This work was able to mesh the gasifier with less than 1 million cells, which is enough to provide accurate results. One of the most important tasks in performing numerical simulations for gasification process is the evaluation of species concentration during devolatilization process. In this work, species were evaluated as a result of devolatilization, referred to as volatile breakup, and developed using step by step conversion of the elements in volatile into the species concentrations.

This approach conserves the mass of each of the elements as well as overall heat content in the solid fuel during this conversion. It was assumed that that the volatile material from the solid fuel consists of Carbon (C), Hydrogen (H), Oxygen (O), Nitrogen (N), and Sulfur (S). Other constituents (like Chlorine) exist in very small amount and therefore are neglected in this approach. Volatile matters from solid fuel are initially converted to a pseudo gas phase species, referred to as "volatile" using a devolatilization model. A gas phase volatile break-up reaction, R1 is added to convert this gaseous volatile to several other gas phase species. Species TAR is another pseudo gas phase species added to account for left over carbon from the volatiles, if any. Step by step approach is developed to evaluate the mass fractions of resultant species. Stoichiometric coefficients a, b, c, d, e, f, g, and h for the resultant species are calculated from the obtained mass fractions and molecular weights of these species. Using current approach, a SCHEME script is written to automatically calculate stoichiometric coefficients of volatile break-up reaction and setup the gasification simulation in ANSYS FLUENT (ANSYS. 2014).

Volatile
$$\rightarrow$$
 a CO + b H₂S + c CH₄ + d H₂O + e H₂ + f N₂ + g TAR (R1)

This script in the form of add-on module is referred to as "Gasification calculator." Heating value of species, *Volatile* is obtained by first converting as-received heating value of cal to its lower heating value and then subtracting the lower heating value of fixed carbon (Char) from it. Latent heat of water vapor formed from moisture content and hydrogen is considered appropriately while converting as-received heating value of waste (wood) to its lower heating value. A three dimensional CFD solver ANSYS FLUENT 14.5 is used to solve a set of governing equations for the gas phase and the solid phase. RANS based mass, momentum, turbulence, energy and species conservation equations are solved in Eulerian reference frame for the transport of gas phase.

Solid-particles/droplets are tracked using Lagrangian reference frame referred to as Discrete Phase Model (DPM) [9].

The entire gasification process will be broken up on the following sub processes:

- Inert heating of the fuel from initial temperature to the vaporization temperature
- Release of moisture from the fuel
- Devolatilization and tar cracking
- Char combustion and gasification
- Inert heating of ash.

Inert heating will be taken care by inbuilt inert heating law. Moisture release will be taken care by wet combustion model. For devolatilization, FLUENT allows only one species as the devolatilizing species. However, in actual case different species are evolved during devolatilization. This can be taken care by defining a pseudo species as a devolatilizing species and then breaking up this species into required composition of species using a volumetric reaction (volatile break-up reaction). Different gas phase reactions (R2-R7) will be defined as volumetric reactions. Other heterogeneous reactions (R8-R11) taking place during char combustion and gasification will be defined as particle surface reactions once the multiple char reactions model is enabled.

	CO combustion	(R2)
	$CO + 0.5 O_2 \rightarrow CO_2$	
•	Water-gas shift	(R3)
	$CO + H_2O \rightarrow CO_2 + H_2$	
	$CO_2 + H_2 \rightarrow CO + H_2O$	
•	H ₂ combustion	(R4)
	$H_2 + 0.5 O_2 \rightarrow H_2O$	
•	CH ₄ combustion	(R5)
	$CH_4 + 1.5 O2 \rightarrow CO_2 + 2 H_2O$	
•	CH ₄ reforming	(R6)
	$CH_4 + H_2O \rightarrow CO + 3 H_2$	
	$CO + 3 H_2 \rightarrow CH_4 + H_2O$	
•	Tar combustion	(R7)
	$TAR + CO \rightarrow n CO_2$	
•	Char oxidation	(R8)
	$C < S > + O2 \rightarrow CO_2$	
•	CO ₂ gasification	(R9)
	$C < S > + CO_2 \rightarrow 2 CO$	
•	H ₂ O gasification	(R10)
	$C < S > + H_2O \rightarrow CO + H_2$	
•	H ₂ gasification	(R11)

6.2 Model Setup

The model is developed and ready to be applied on the right gasifier geometry (Figure 6-1)). This work built and meshed the geometry several times due to significant design changes (Figure 6-2). This delayed the simulation analysis. Since the design is complex, it was not possible to use automatic meshing procedure, so gasifier had to be decomposed on parts with simple geometry that could be meshed manually to receive good quality mesh (orthogonal quality > 0.1) (Figure 6-3). To ensure more accurate results, it was decided to use a 360-degree geometry despite the increase in the number of cells (Figure 6-4). The final design and corresponding mesh are shown on Figures 6-5 and 6-6. The small gap (0.08-in.) between rotating and nonrotating plates that allows entering small amount of air will also be incorporated in the model (Figure 6-7). To reduce time of calculations, the model did not include the external big pipe that surrounds the gasifier and keeps it heated. The heat flux is calculated separately and will be applied as boundary conditions on the walls. The feedstock is treated as porous material with 25% porosity. It will be introduced as feed inlet with injection rate of 0.018 kg/s. As results the model will provide contours of mass fractions of syngas main species and evaluate the temperature in different part of gasifier.

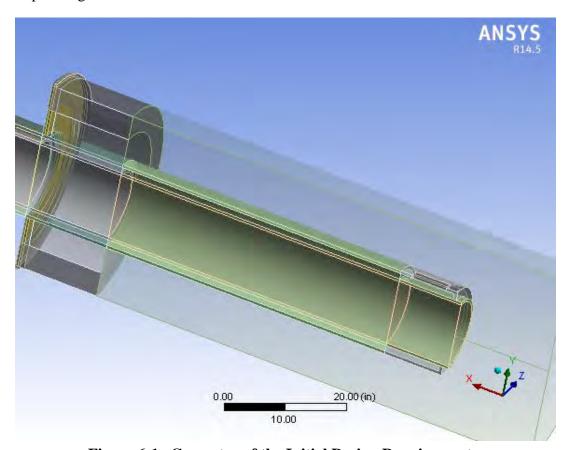


Figure 6-1. Geometry of the Initial Design Requirements.

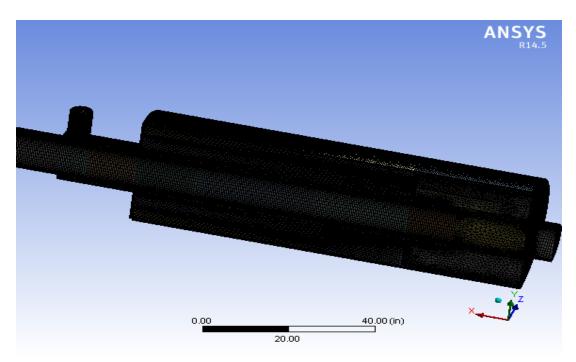


Figure 6-2. Mesh of the Initial Design Requirements.

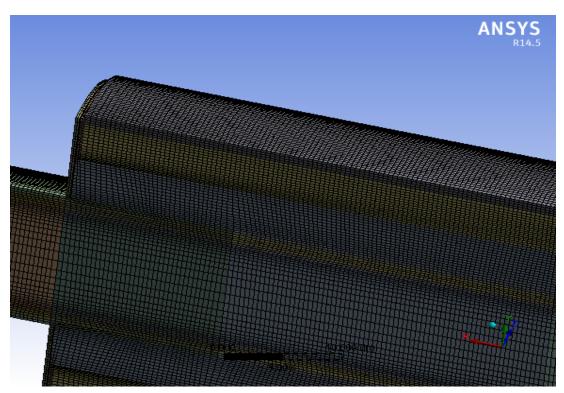


Figure 6-3. Close up View of Meshed Geometry.

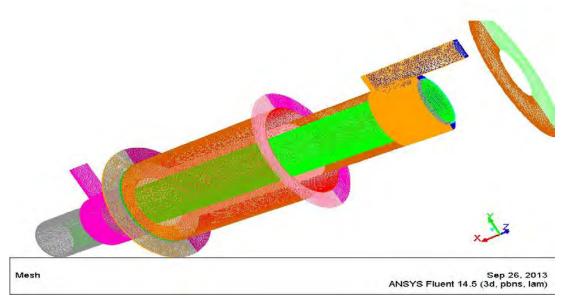


Figure 6-4. Meshed Geometry of Other Design Requirements, 360 Degrees.

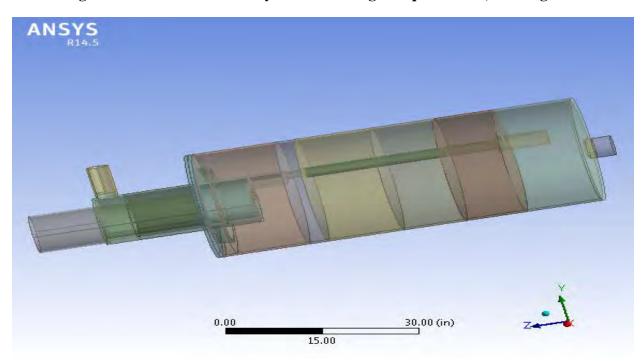


Figure 6-5. Geometry of the Last Design Requirements.

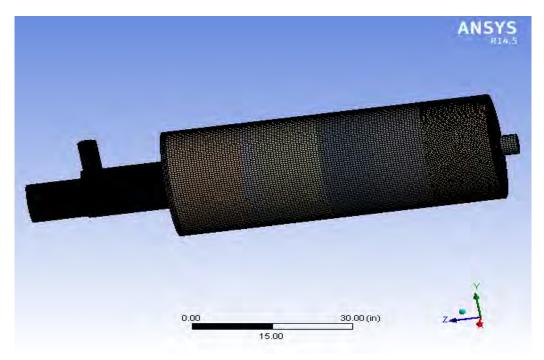


Figure 6-6. Mesh of the Last Design Requirements.

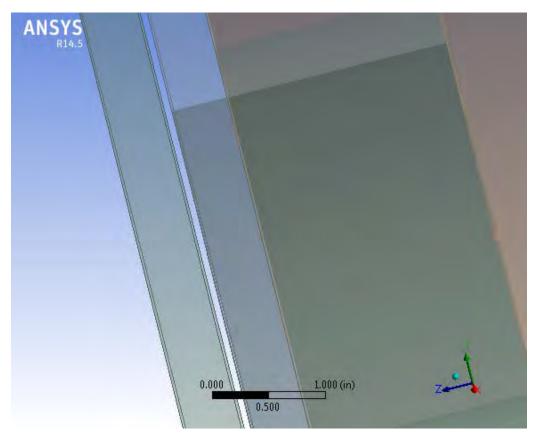


Figure 6-7. Air Entrance Gap between Rotating and Nonrotating Plate.

6.3 Geometric and CFD Modeling

Fluid dynamic modeling of the Reaction Chamber was initiated in FY13 to provide additional insight into the operating characteristics of the Rotary Kiln Gasifier under development at SUNY Cobleskill. CFD modeling of the primary reaction chamber initially used the ANSYS FLUENT software available at Picatinny Arsenal. A parallel effort using the Star-CCM+ software available at Benét Labs was initiated later in the year to take advantage of their computational resources. ANSYS FLUENT and Star-CCM+ are both well respected commercial software packages. Consistent geometric and thermochemical models were supplied to both CFD codes.

Modeling activity at Benét Labs focused on three areas:

- ProE solid model descriptions of the reaction chamber and the exhaust manifold surrounding it
- CFD analysis of exhaust manifold thermal performance
- CFD analysis of reaction chamber performance.

Solid models generated at Benét Labs were transmitted to Picatinny Arsenal staff for use in their FLUENT model preparations. The following sections describe results from each of these areas.

6.3.1 Geometric Model Development

The ProE solid modeling effort provided a convenient means to track test hardware evolution and to provide hardware geometry to the CFD software. Test hardware development followed a largely empirical path, which resulted in the testing of several hardware configurations during the current fiscal year. All configurations were similar in concept, but very different in detail. Concept similarities included the following:

- A central stationary piping system for waste supply and syngas extraction
- A rotating reactor drum assembly surrounding the piping assembly and containing the waste material undergoing chemical reaction
- A gap interface between the rotating drum and the stationary piping assembly to supply combustion air to the char bed at the lower end of the reactor chamber and between the rotor and the stator
- A stationary exhaust shroud channeling diesel exhaust gas over the outer surface of the reactor and supplying heat to the interior of the reactor.

Figure 6-8 shows these representative Reaction Chamber components and regions. Figures 6-9 – **6-12** show the four principal configurations tested during FY13.

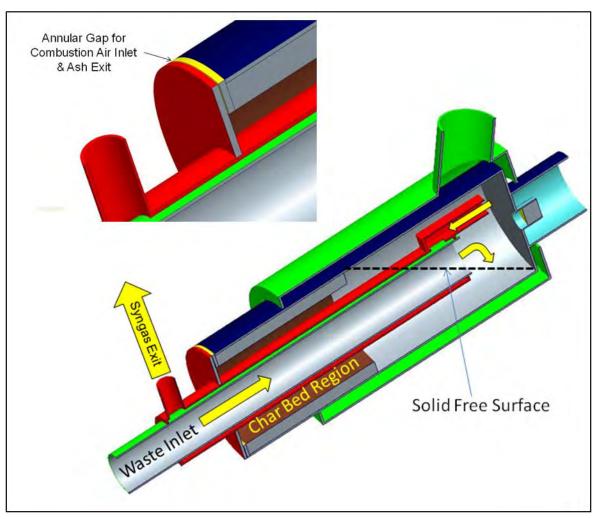


Figure 6-8. Representative Reaction Chamber Regions.

The May 2013 configuration (Figure 6-9) was operated with the reactor axis at an inclination angle of 22 degrees and the reactor drum rotating at various angular velocities. Several problems were encountered in this configuration. The long waste stream feed pipe often became impacted with compressed waste, which required system shutdown. Waste material in the reaction chamber developed a free surface that sometimes partially covered and plugged the syngas extraction pipe inlet leading to system shutdown. Increased drum angular velocity altered the free surface location to alleviate covering of the syngas pipe entrance, but also increased the potential for combustion air to burn through the char bed adjacent to the stationary piping, and provide a direct path for combustion air to reach and prematurely oxidize the syngas.

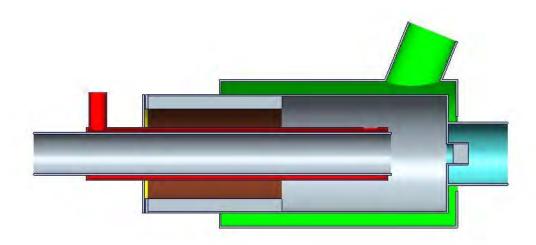


Figure 6-9. May 2013 Configuration.

The July 2013 configuration (Figure 6-10) added an extension to the syngas pipe entrance to move the syngas pipe was well above the expected waste material free surface. Testing quickly showed this modification did not provide successful operation, because the highly compacted material in the feed pipe filled and plugged the entire upper end of the reactor chamber, and did not distribute well onto the waste material free surface. Combustion air was still able to burn through the char bed adjacent to the stationary piping, and to generate a direct path for combustion air to reach and prematurely oxidize the syngas. Inadequate sealing in the lower end of the reaction chamber was also observed, which also permitted combustion air to flow through and around the porous fire brick adjacent to the outer edge of the char bed, and contribute to premature combustion of the syngas in the upper end of the reaction chamber. The additional testing associated with this configuration confirmed previously identified problems were not resolved, and led to isolation of problems associated with leakage around the fire brick insulation. Clearly additional changes were needed before successful reactor operation would become a reality.

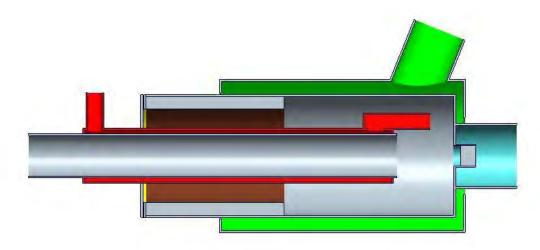


Figure 6-10. July 2013 Configuration.

The September 2013 configuration (Figure 6-11) included changes that alleviated many of the problems identified in the previous configuration. The reduced length of the waste stream feed pipe resulted in less compaction of the waste material in the feed pipe, a lower free surface level in the chamber, and improved delivery of the waste material to the top of the char bed. The syngas extraction pipe was also revised to locate it close to the top of the reaction chamber. Both of these changes virtually eliminated the potential for waste material to plug the upper end of the reaction chamber and directly enter the syngas extraction piping. The fire brick adjacent to the char bed were replaced by a steel wall assembly filled with Fiberfrax ceramic fiber and welded to the reaction chamber outer wall, which eliminated the potential combustion air leakage. To maintain the integrity of the char bed and reduce the potential for premature combustion of the syngas, the chamber inclination was increased to 40 degrees, and the rotation rate was limited to 0.5 rpm. Reactor performance was much improved, but still not acceptable.

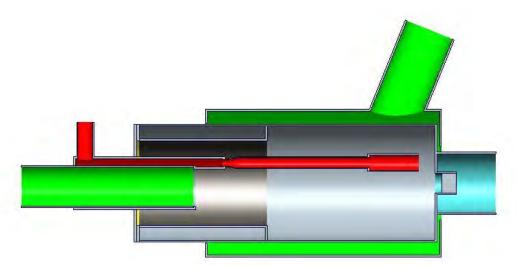


Figure 6-11. September 2013 Configuration.

The October configuration (**Figure 6-12**) eliminated the Fiberfrax insulation and most of the steel assembly containing it, which increased waste / char bed volume and allowed reaction chamber performance to approach system goals. The shortened feed pipe and increased bed axial cross-section appears to allow the feed stream to directly enter and replenish the char bed and to nearly the eliminate premature combustion of the syngas. Planned CFD analysis was expected to yield further insight into mechanisms controlling system performance. Because chamber internal temperature measurements were lower than expected, CFD based heat exchanger analysis of the exhaust heating configuration was initiated in parallel with CFD modeling of the primary reaction chamber.

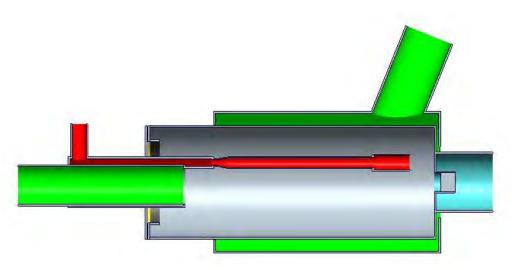


Figure 6-12. October 2013 Configuration.

Because of the several configuration changes, initial CFD analysis was limited to evaluating the performance of the exhaust gas heat exchanger associated with the September and October 2013 configurations (**Figure 6-13**). CFD modeling of the primary reaction chamber for the October 2013 configuration is currently underway in both FLUENT and Star-CCM+.

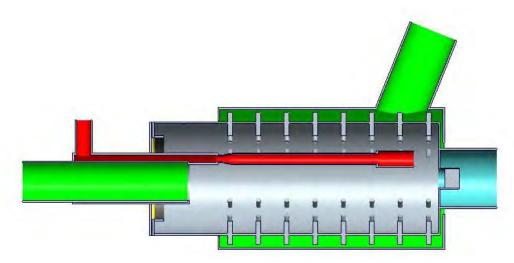


Figure 6-13. October 2013 Configuration with "Pin-Fin" Heat Transfer Surface Extensions.

The lower than expected chamber temperatures measured during testing of the October configuration prompted evaluation of a "Pin-Fin" enhanced chamber wall configuration. Measured exhaust inlet and exit temperatures suggested the thermal efficiency of the current heat exchanger geometry could be significantly improved. The October configuration was analytically modified to include the "Pin-Fin" surface extensions shown in **Figure 6-13**. "Pin-Fins" could be readily applied to the current system with either an "external" or "through" pin configuration. Exhaust manifold thermal performance results for the "external" version are presented in the next section.

6.3.2 Exhaust Manifold CFD Analysis

Two exhaust manifold models were completed to evaluate the thermal performance of the current configuration and a practical "Pin-Fin" configuration. From the outside, both models appeared as shown in **Figure 6-14**, and considered heat transfer in both the fluid and the exhaust shell. The reference model assumed the outer surface of the rotor adjacent to the exhaust gas was a uniform 533 K, while the "Pin-Fin" enhanced model assumed the inner reactor wall was a uniform 500 K and considered heat transfer in both the reactor wall and the exhaust shell. Both models were supplied with 922K air entering a tangential inlet port at 0.09 kg/s and exiting a "nominally" vertical exhaust pipe at the upper end of the reactor, and neither model considered radiations effects.

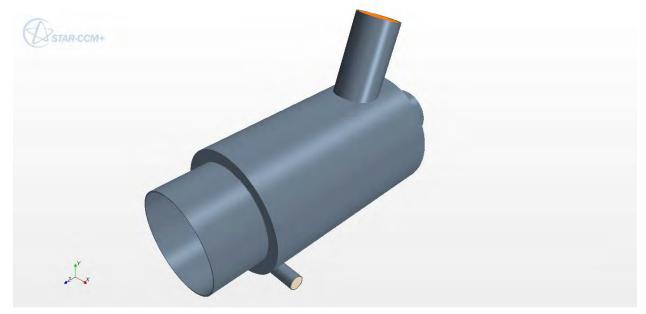


Figure 6-14. Nominal Exhaust Manifold Geometry.

6.3.2.1 Current Reactor Geometry

In the reference model, the steady RANS conservation equations were solved in a coupled-implicit manner on 375K cell mesh. The solution included the effects of flow turbulence, reactor wall rotation, and buoyancy. **Figure 6-15** shows the resulting Rotor Heat Flux distribution, which was fairly uniform except in the vicinity of the tangential exhaust gas inlet. For the assumed 533K rotor surface temperature, heat entered the rotor at the rate of 11.0 kW. The average heat transfer coefficient (H) was 18.9 W/m2/K, the corresponding surface area (S) was 2.5 m², and the H*S product was 47.3 W/K.

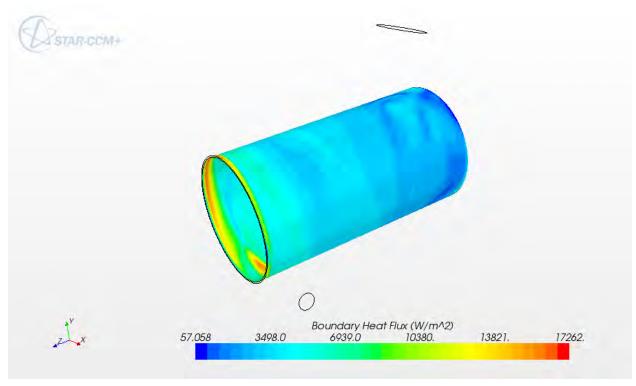


Figure 6-15. Rotor Surface Heat Flux Distribution.

6.3.2.2 Pin-Fin Enhanced Reactor Geometry

The "Pin-Fin" configuration model was solved in an equivalent manner on a much larger 2.285 million cell mesh. The larger grid size was required to "nominally" resolve flow characteristics around the pin-fins. Figure 6-16 shows the resulting Rotor Heat Flux distribution, which was fairly uniform except in the vicinity of the tangential exhaust gas inlet. For the assumed 500K internal rotor surface temperature, heat entered the rotor at the rate of 12.8 kW. The average heat transfer coefficient (H) was 16.0 W/m²/K, the corresponding surface area (S) was 2.9 m², and the H*S product was 46.5 W/K. The thermal performance of this configuration was slightly less than the reference configuration, and would not be considered a beneficial addition to the system. Alternate surface enhancements may yield significantly improved performance without incurring excessive exhaust side pressure drop.

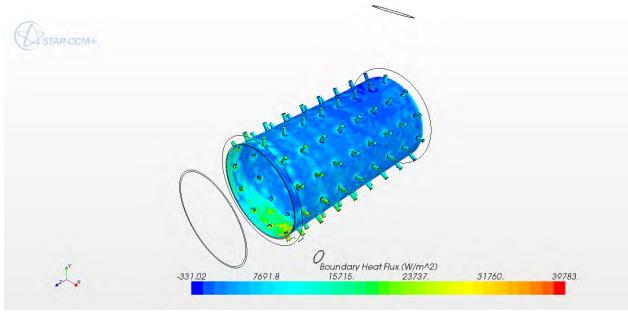


Figure 6-16. Rotor Surface Heat Flux Distribution with "Pin-Fins."

6.3.3 Reactor CFD Analysis

CFD analysis of the reactor chamber started with a fluid-thermal analysis of the reaction chamber without the effects of chemistry and discrete particles. This permitted selection and evaluation of a candidate mesh without the complexity of the chemical and particle dynamics. The initial fluid-thermal analysis solved the steady RANS conservation equations on a 1.03 million cell grid. The subsequent full model is expected to use the same grid, and include chemical and particle dynamics representative of the full system. Both steady and transient solutions are under consideration. The chemical and particle dynamics available in Star-CCM+ are similar to those available in ANSYS FLUENT, and will be selected for consistency between the two software packages. A brief discussion of relevant literature, chemical modeling, and particle dynamics has been provided in the section covering the Methodology and Model Setup of the ANSYS FLUENT model, and will not be repeated here.

6.3.3.1 Initial Fluid-Thermal Analysis

The initial model considered the fluid dynamics of chamber "air" coupled to the energy flows in the rotor and stator walls under boundary conditions representative of actual chamber operation. The inlet flow was set at 0.019 kg/s, the exit of the syngas extraction pipe was fixed to a static pressure of -1990 Pa relative to ambient, and the outer edge of the rotor-stator gap at the base of the reaction chamber was fixed to ambient conditions of 101325 Pa and 300K. A uniform convective boundary condition with a heat transfer coefficient of 300 W/m2/K and an exhaust temperature of 700 K was applied to the rotor surface in contact with the exhaust flowing through the exhaust shroud. Rotor and stator wall properties will be updated from Aluminum to Carbon Steel, and rotor convective boundary condition will be consistent with the above exhaust manifold analyses before execution of the full model.

Figures 6-17 to 6-20 show representative flow, pressure, and temperature distributions from this initial solution. The grid and solution parameter adjustments required to obtain this initial solution will be carried over to the full chamber solution.

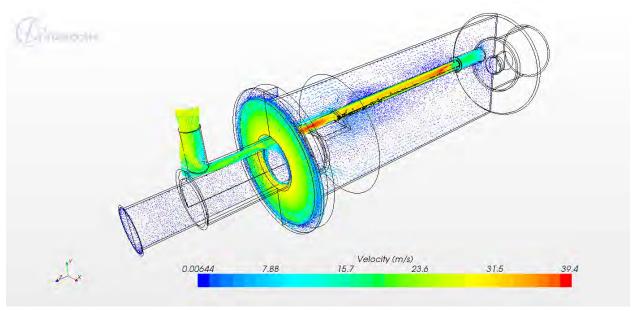


Figure 6-17. Representative Flow Patterns – Vertical Cross-Section.

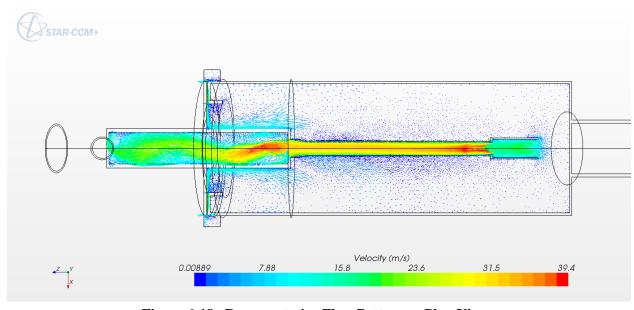


Figure 6-18. Representative Flow Patterns – Plan View.

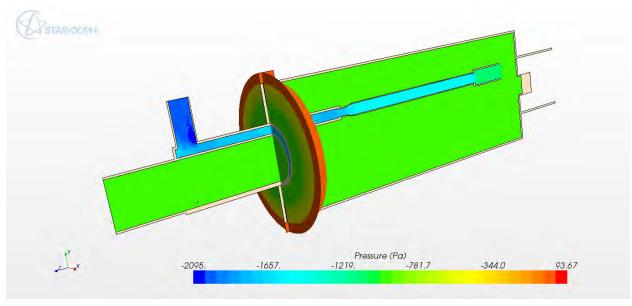


Figure 6-19. Representative Pressure Distributions without Chemical and Particle Dynamics.

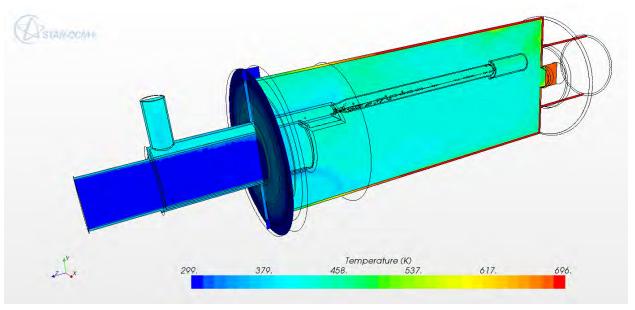


Figure 6-20. Representative Temperature Distributions without Chemical and Particle Dynamics.

6.3.3.2 Fluid-Thermal Analysis with Lagrangian Feed and Chemistry

Model preparation for a more complete solution of the Gasifier Reaction Chamber dynamics included selected review of relevant literature, and exploration of the Star-CCM+ modeling capabilities to confirm suitability for the current problem. The required chemical and particle dynamics will be added to the initial fluid dynamic model from Section 3.1 to form the basis for comparison to test data and evaluation of alternate chamber configurations.

6.3.4 Conclusions

Completed work has tracked evolution of the test hardware at SUNY Cobleskill, provided solid models for CFD activities at both Benét Labs and Picatinny Arsenal, has helped quantify thermal boundary conditions for the reaction chamber, and provided a basis for CFD evaluation of reaction chamber performance.

6.4 Equipment Arrangement

In addition to the thermodynamic modeling, staff at Benét Labs created detailed 3-D models of all parts of the gasifier system. The goal was to show that all the equipment could fit into standard shipping containers. TRICONs were selected because it is more likely that smaller camps would have the capability to move these, rather than an entire 20-ft container.

Figure 6-21 and Figure 6-22 show the results of this effort. All of the gasifier system, including generator fits into three TRICONs, which can be hauled on the back of a HEMTT. The TRICONs can be mounted in a standard steel rack, that can be mechanically dismounted (rolled-off the back) from the HEMTT.



Figure 6-21. Side view of gasifier equipment in TRICONs.



Figure 6-22. Top View of Gasifier System in TRICONs.

7. Diesel Engine Efficiency Studies

This chapter presents syngas efficiency testing on using commercial diesel engines with 60 kW generators, the common size for contingency power applications

7.1 EPA Tier 2 and Tier 3 Engines

Modern diesel engines replace mechanical governors with electronic fuel injection and electronic ECMs. Electronic governor controls maintain the engine speed at the exact synchronous speed to maintain 60 Hz electrical frequency. Electronic governors maintain precision frequency response over the entire operating range for electrical load.

Zero percent electronic governor "droop" is not a desired feature when dual fueling. Mechanical governors operate at a 4% governor droop (1860 rpm no load and 1780 rpm full load) for generator drives. Observations indicate a loss in fuel savings due to the fact that the electronic controls over-inject liquid fuel, which force the engine to operate more like a diesel cycle than as a combination "Diesel-Otto." The main observations are additional liquid fuel usage and heavy PM in the exhaust stream.

Tier 2 and Tier 3 engines were tested as follows:

- 1. Sixty-kW Generator with EPA Tier 2 John Deere 5030HF270 with electronic controlled fuel injection and Woodward electronic governor.
 - a. No abnormal PM.
 - b. Maximum liquid fuel savings measured was 65% on IIFPRG syngas.
 - c. All tests conducted at >90% load. No noticeable loss in engine power when dual fueling.
- 2. Sixty-five-kW Generator with EPA Tier 3 John Deere 4045TF285 with electronic controlled fuel injection and John Deere electronic ECM.
 - a. Heavy PM observed at the slightest amount of dual fueling.
 - b. Maximum liquid fuel savings measured was 37% on IIFPRG syngas.
 - c. All tests were conducted at > 90% load. There was no noticeable loss in engine power when dual fueling.

7.2 Feedstocks for EPA Tier 2 Engines Testing

Researchers decided to stop testing the EPA Tier 3 engine due to excessive black smoke emissions. The EPA Tier 2 engine was tested for 60-second fuel usage "clip tests" using syngas created from the IIFPRG. Table 7-1 lists the feedstocks tested.

Table 7-1. Clip Test Feedstocks.

			Diesel Clip Tests
Test	Date	Time	Feedstock
Test 1	11/19/2013	13:49	Cooksburg Wood Chips
Test 2	11/19/2013	14:17	50% Cooksburg Chips / 50% Prentice Hall Cafeteria Waste
Test 3	11/20/2013	12:52	Cooksburg Wood Chips
Test 4	11/20/2013	13:52	70% Cooksburg Wood Chips, 30% HDPE by weight
Test 5	11/20/2013	13:54	70% Cooksburg Wood Chips, 30% HDPE by weight
Test 6	11/20/2013	15:15	50% Cooksburg Wood Chips, 50% Horse Manure by weight
Test 7	11/20/2013	15:34	50% Cooksburg Wood Chips, 50% Horse Manure by weight
Test 8	11/21/2013	12:10	50% Cooksburg Wood Chips, 50% Cafeteria Waste by weight
Test 9	11/21/2013	12:12	50% Cooksburg Wood Chips, 50% Cafeteria Waste by weight
Test 10	11/21/2013	14:45	50% Cooksburg Wood Chips, 50% Cafeteria Waste by weight

7.3 Test Configuration

Figure 7-1 shows the equipment used to measure liquid fuel usage. Fuel consumption is determined using the change in fuel level in a clear sight glass over a 60-second test period. The density used for liquid diesel fuel is 7.1 pounds per US gallon.

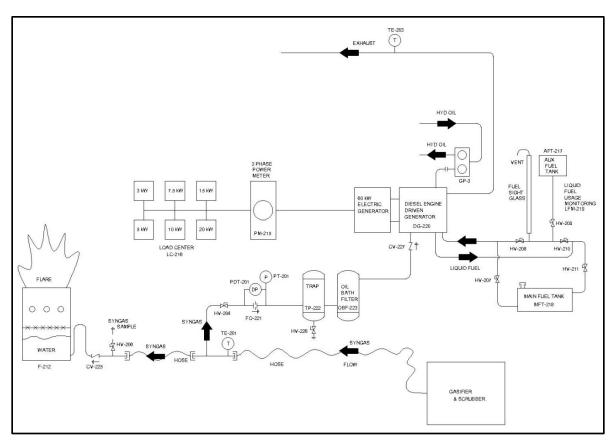


Figure 7-1. Equipment Configuration for Clip Tests.

7.4 Baseline Factory Ratings

Figure 7-2 shows the fuel consumption for the EPA Tier 2 John Deere 5030HF270 engine as shown on the engine manufacturer's data sheet. Figure 7-3 shows the brake specific fuel consumption and Figure 7-4 shows the thermodynamic efficiency as calculated from the engine data sheet.

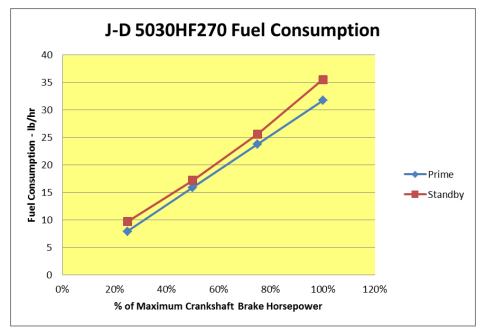


Figure 7-2. Fuel Consumption.

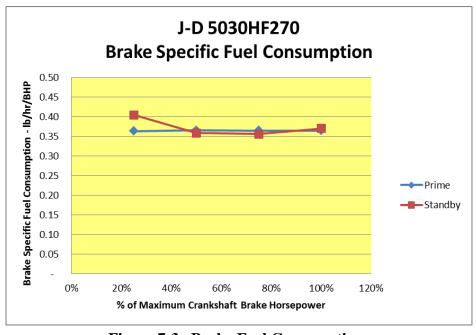


Figure 7-3. Brake Fuel Consumption.

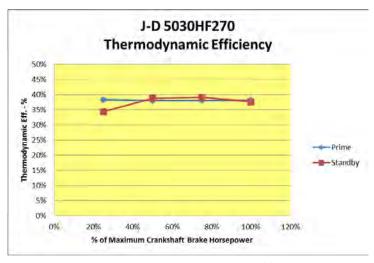


Figure 7-4. Thermodynamic Efficiency.

7.5 Clip Test Procedure

Clip tests are conducted as follows:

- 1. Hand valves HV-207 and HV-211 are open. HV-208 and HV-210 are closed. The engine operates normally using fuel from main fuel tank MFT-218.
- 2. Open HV-209. Fuel flows from aux. fuel tank AFT-217 and fills the sight glass.
- 3. Close HV-209 when the sight glass is full.
- 4. Open HV-208 and HV-210. Close HV-207 and HV-211. Fuel to run the engine flows from the fuel sight glass.
- 5. Open HV-204 to allow syngas to flow into the engine.
- 6. Mark the fuel level on the sight glass with a dry erase marker and start the 60-second timer.
- 7. Mark the fuel level on the sight glass with a dry erase marker when the 60-second timer expires.
- 8. Obtain exhaust emissions.
- 9. Open HV-207 and HV-211 to allow diesel fuel to flow from main fuel tank MFT-218.

7.6 Clip Test Results

The data in Table 7-2 summarize the results from this set of tests. This shows that 60% reductions in liquid fuel usage (for a constant electric load) are achievable on IIFPRG syngas, in diesel engines similar to those in common tactical generator sets. While CO exhaust emissions increase slightly, NO_x emissions are reduced by roughly 50%. The afterburner system should combust almost all CO from the exhaust.

Figure 7-5 shows no loss in thermodynamic efficiency when dual fueling with an electronic governor, which is contrary to the mechanical governor findings. The data indicates the electronic governor may be injecting more liquid fuel than necessary to maintain precision frequency control. Another possibility is electronic fuel injection atomizes liquid fuel better by pulsing up to 100 times per injection cycle. This may help to compression ignite the gaseous fuel-air mixture more efficiently.

Table 7-2. Clip Test Results.

Test:		Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 7	Test 8	Test 9	Test 10
Test Date:		11/19/2013	11/19/2013	11/20/2013	11/20/2013	11/20/2013	11/20/2013	11/20/2013	11/21/2013	11/21/2013	11/21/2013
Test Time:		13:49	14:17	12:52	13:52	13:54	15:15	15:34	12:10	12:12	14:45
Electrical Load:	kW	50	50	50	50	50	50	50	50	50	50
Power Take Off Load:	BHP	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5
Syngas Flow to Engine During Test:	DITE	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Syngas Sample Number:				SB112013-1245			SB112013-1515			SB112113-1217	
Syngas Low Heating Value	BTU/scf	122	134	135	176	176	145	145	119	119	109
Visual Opacity	BTU/SCI	No Visible PM	No Visible PM		No Visible PM	No Visible PM	No Visible PM	No Visible PM	No Visible PM		No Visible PM
Visual Opacity		NO VISIBLE FIVE	NO VISIBLE FIVE	NO VISIBLE FIVE	IVO VISIBIE FIVI	NO VISIBLE FIVE					
Dual Fuel Test											
Test Start Measurement:	inch	26,75	33.375	40	40.5	27	35.75	37	36.5	30.25	23.625
Test End Measurement:	inch	43.25	42.25		50.75	34.5	48.5	49.75	50.5		35.125
Test Duration:	sec	45.25	42.23		60	60	46.3	49.73	60		55.125
Liquid Fueling Rate	gal/hr	2,56	2.06		2.38	1.74	2.97	2.97	3.26		2.67
Liquid Fueling Rate	lb/hr	18.16	14.65		16.92	12.38	21.05	21.05	23.12		18.99
Syngas Flow to Engine	SCFM	36.5	36.5		20.3	27.0	22.0	27.8	26.5		24.6
Gaseous Fueling Rate	BTU/hr	267505	293817		214550	285013	191723	241563	189092		160884
Liquid Fueling Rate	BTU/hr	332734	268456		310048	285013	385669	385669	423480		347859
Total Gross Fueling Rate	BTU/hr	600240	562273	574738	524598	511877	577392	627233	612573	608243	508743
Crankshaft Load	BHP	88.7	88.7	88.7	88.7	88.7	88.7	88.7	88.7	88.7	88.7
Crankshaft Load	BTU/hr	225654	225654	225654	225654	225654	225654	225654	225654		225654
Liquid Diesel Fuel Savings	БТО/П	47.6%	56.2%	46.4%	51.0%	64.1%	37.0%	37.0%	31.7%	32.9%	43.9%
Dual Fuel Thermodynamic Efficiency		37.6%	40.1%	39.3%	43.0%	44.1%	39.1%	36.0%	36.8%	37.1%	45.9%
Dual Fuel Intermodynamic Emclency		37.0%	40.1%	39.3%	45.0%	44.1%	39.1%	30.0%	30.6%	37.176	44.476
Baseline Fuel Consumption											
Test Start Measurement:	inch	12.75	34.5	38.25	26.375	26.375	29.5	29.5	27.5	27.5	27.5
Test End Measurement:	inch	33.75	54.75	59.25	47.275	47.275	49.75	49.75	48	48	48
Test Duration:	sec	60	60	60	60	60	60	60	60	60	60
Liquid Fueling Rate	gal/hr	4.88	4.71	4.88	4.86	4.86	4.71	4.71	4.77	4.77	4.77
Liquid Fueling Rate	lb/hr	34.67	33.44	34.67	34.51	34.51	33.44	33.44	33.85	33.85	33.85
Liquid Fueling Rate	BTU/hr	635220	612534	635220	632195	632195	612534	612534	620096	620096	620096
Total Gross Fueling Rate	BTU/hr	635220	612534	635220	632195	632195	612534	612534	620096	620096	620096
Crankshaft Load	ВНР	88.7	88.7	88.7	88.7	88.7	88.7	88.7	88.7	88.7	88.7
Crankshaft Load	BTU/hr	225654	225654	225654	225654	225654	225654	225654	225654	225654	225654
Baseline Thermodynamic Efficiency		35.5%	36.8%	35.5%	35.7%	35.7%	36.8%	36.8%	36.4%	36.4%	36.4%
Dual Fuel Emissions											
co	% Vol	NA	NA	NA	0.16%	0.16%	0.41%	0.41%	NA	NA	NA
O2	% Vol	NA	NA	NA	10.83%	10.83%	11.00%		NA	NA	NA
CO ₂	% Vol	NA	NA	NA	8.70%	8.70%	7.90%		NA	NA	NA
NOx	PPM	NA	NA	NA	300	300	213	213		NA	NA
Baseline Emissions											
со	% Vol	NA	NA	NA	0.04%	0.04%	0.04%	0.04%	NA	NA	NA
O2	% Vol	NA	NA	NA	12.90%	12.90%	12.90%	12.90%	NA	NA	NA
CO ₂	% Vol	NA	NA	NA	6.30%	6.30%	6.30%		NA	NA	NA
NOx	PPM	NA	NA	NA	493	493	493	493	NA	NA	NA

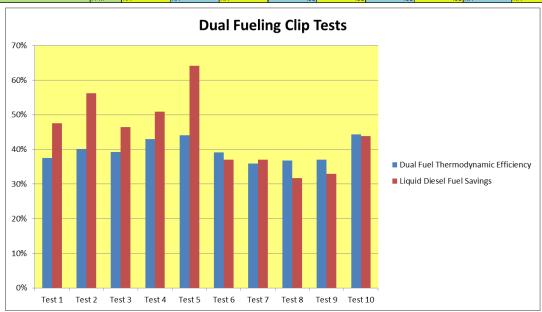


Figure 7-5. Clip Test Efficiency and Fuel Savings.

7.7 Conclusions

The diesel engine performance, when dual fueled on nitrogen diluted methane, is similar to operating on ultra-low energy syngas. Weak gaseous mixtures, that are not flammable in air, still provide liquid fuel savings in a diesel engine.

Diesel engines can operate with little or no power loss, even when dual fueled at high gaseous fueling rates using very weak syngas. Liquid fuel savings of 83% have been measured on 135 BTU/scf LHV syngas with less than 1.5% moisture content. Reducing the dewpoint of weak syngas greatly increases liquid fuel savings by reducing the thermal load (due to moisture) on the engine.

The engine governor automatically adjusts the liquid fuel injection rate to maintain crankshaft speed at the target 60 Hz synchronous speed. The engine automatically increases speed when feeding gaseous fuel. The governor automatically reduces the liquid fuel injection rate to provide a liquid fuel savings. Gaseous fueling can vary at any flow rate, without concern for air to fuel ratio, by mixing the syngas directly with the engine intake airflow.

Over-fueling is observed by engine speed instability. The governor momentarily stops the injection of liquid fuel to reduce engine speed. Compression ignition stops, causing the engine speed to decrease rapidly. The governor senses the loss of engine speed and starts liquid fuel injection again. The engine speed "hunts" until the gaseous fueling rate is reduced.

The optimum fueling point is determined by engine speed at any electrical load. Gaseous fuel is fed into the engine until the crankshaft speed reaches 98% of the no load governor speed. The control of air to fuel ratio is not required. This type of gas metering control will not work on engines with electronic governors using precision frequency regulation.

Gaseous fuel with significant nitrogen content reduces NOx emissions. Ultra-low energy syngas with a LHV between 100 and 160 BTU/scf provides the lowest NOx emissions. Reducing engine load also reduces NOx emissions.

Dual fueling a diesel engine increases carbon monoxide emissions. A significant loss of thermodynamic efficiency was also observed with mechanical governors. Researchers feel this is the result of the diesel thermodynamic cycle transitioning towards an Otto thermodynamic cycle as the gaseous fueling rate increases.

A significant loss of thermodynamic efficiency was not observed on electronically governed engines. These engines did not provide liquid fuel savings comparable to mechanically governed engines. Excessive PM (diesel soot) was observed in EPA Tier 3 engines. These observations indicate the electronic governor control with precision frequency regulation is over-fueling the engine with liquid fuel to maintain the precise synchronous speed. Reprogramming electronic controls to provide a traditional 4% governor droop may correct these problems.

After all of the gasification experiments, the diesel engine used to burn syngas was disassembled and thoroughly inspected. The engine was in very good condition, with small amounts of wear that could be attributed to syngas operation. Appendix D gives details of this inspection.

8. Dewatering Waste via Mechanical Compression

8.1 Mechanical Compression to Reduce Moisture Content

One of the chief challenges of processing unsorted Municipal Solid Waste (MSW) is the inconsistent and often high moisture content. Commercial mass-burn incineration plants rely on homogenization of vast quantities of incoming waste, excess oxygen, and sometimes supplemental fuels to overcome wet wastes. Some small scale gasification systems attempt to dry incoming waste by diverting a portion of produced thermal energy.

The current objective of the testing being done on biomass products is to test several theories and ideas concerning mechanical dewatering and moisture content percentage reduction. The objective is to first complete small scale testing to find out if using just mechanical and hydraulic methods the moisture content percentage on a wet basis scale can be reduced to a moisture percentage level that will allow for those materials to be burned cleanly and efficiently for heat, power and fuel generation and use. After testing has confirmed that the moisture percentage can be reduced by mechanical means alone or other methods must be used in conjunction with mechanical dewatering a prototype machine will be designed and built for use in testing the mechanical dewatering process. During the testing phase the amount of product being compressed and extruded as well as the integrity of the pressed products shape as well as density and moisture content shall all be tested and observed. Modifications will be done during and after testing to fix any problems or malfunctions that are observed during the building and testing phase of the prototype machine.

This report is to examine the results of tests on several biomass materials using a mechanical method to press out water and to reduce the amount of moisture content percentage within the materials themselves. These test results are the preliminary findings from the testing of paper at 80 and 50% moisture and switchgrass tested at 80% moisture content. The test were done to see what the results were after mechanically dewatering the samples and if the percentage of moisture removed from the biomass type being tested was within the allowable moisture percentage range to allow for it to be burned/combusted without the need for adding a drying element to the prototype that will be built in the near future.

8.2 Mechanical Dewatering Tests Procedure

I Determine as-Received Moisture Content of Feedstock Sample

- 1. Obtain an approximate 5 gallon (clean bucket) sample of as-received wet feedstock.
- 2. Remove a sample of about 100 grams from the center of the bucket.
- 3. Record the tare weight of the small foil drying pan.
- 4. Place the 100g wet sample in the small foil drying pan and spread the sample out evenly.
- 5. Record the total combined gross weight of the foil drying pan and the 100 gram as-received wet sample.
- 6. Calculate the net sample weight (subtract the gross weight from the tare weight).
- 7. Place the foil sample pan in the drying oven at 115 °C (239 °F) for at least 1 hour.
- 8. Remove the foil sample pan from the oven and measure the total gross weight.

- 9. Determine the net weight of the dried sample by subtracting the gross weight from the tare weight.
- 10. Calculate the percentage moisture (wet basis) of the as-received feedstock samples.

I Sample Preparation

- 1. Remove about 200 grams and place in one or two large foil pans (keep material depth less than 1-in.).
- 2. Place the large foil pans in the drying oven at 115 °C (239 °F) for at least 12 hours. Mix the sample by hand numerous times during the drying period.
- 3. Remove the large foil pans from the drying oven.
- 4. Remove a sample of about 100 grams from each large foil pan.
- 5. Record the tare weight of each small foil drying pan.
- 6. Place the 100g wet sample in the small foil drying pan and spread the sample out evenly (do this twice if there are two samples).
- 7. Record the total combined gross weight of the foil drying pan and the 100 gram dried sample.
- 8. Calculate the net sample weight (subtract the gross weight from the tare weight).
- 9. Place the foil sample pan in the drying oven at 115 °C (239 °F) for at least 1 hour.
- 10. Remove the foil sample pan from the oven and measure the total gross weight.
- 11. Determine the net weight of the dried sample by subtracting the gross weight from the tare weight.
- 12. Calculate the percentage moisture (wet basis) of the dried feedstock samples.
- 13. The samples must be less than 3% moisture before proceeding.
- 14. Measure the tare weight of a large foil pan.
- 15. Using the large foil pan, measure out approximately 200 grams of dried (< 3% moisture) feedstock sample (200 g + tare weight of the large foil pan).
- 16. Measure out 800 grams of tap water.
- 17. Hand mix the 800 grams of water with the 200 gram feedstock sample in the large foil pan.
- 18. As a check,
- 19. Measure the gross pan weight.
- 20. Determine the wet net weight (gross pan tare).
- 21. The wet net weight should be approximately 1000 grams.

II Ram Dewatering Test Procedure

- 1. Measure the tare weight of the compression tube.
- 2. Hand fill the compression tube with wet feedstock (at 80% moisture).
- 3. Measure the gross weight of the filled compression tube.
- 4. Compress the tube to the target hydraulic pressure for 10 seconds.
- 5. Release and retract the hydraulic jack.
- 6. Measure the gross weight of the compressed sample cylinder.
- 7. Remove the pressed sample from the compression cylinder using the shaft punch.
- 8. Measure the tare weight of the foil sample pan.
- 9. Measure the gross weight of the foil sample pan and pressed sample.
- 10. Place sample in oven at 115 °C (239 °F) for 3 hours.
- 11. Measure the gross weight of the dried sample.
- 12. Calculate the percentage moisture in the as pressed condition.

8.3 Results of Compressions Tests

Table 8-1 lists (and Figure 8-1 shows) the percent moisture content that was in each paper sample after it had been mechanically dewatered at the compression indicated. If the moisture content percentage is above 25% moisture content wet then the material cannot be used as a fuel sources as it has too high a moisture content to allow for easy combustion. The numbers of each sample test at 80% and at 50% rule the current use of just compressing and dewatering the samples out. The data shows that across the test samples and at both 80% and 50 % moisture levels the moisture percentage show a steady decrease as the psi levels used in the compaction of each test are increased. With the increase in psi pressure the amount of water is all but removed at the higher levels and the material is just being compacted into a much denser form. With each sample test of paper the percentage numbers of each test for each sample varied between 1 to 5% in either direction of the percentage scale of all tests 1 through 5 across three different paper sample with several wide spread variations in percentage data that are explainable by the amount of initial moisture in the paper that was used in the test pipe, how hard packed the amount of material was in the test pipe and the kind of paper used. In the 80% moisture sample white office paper was used, which was thicker than the shredded magazine paper used for the 50 % moisture test, which would allow for more moisture absorption in the thicker paper but more moisture to be squeezed out from the thinner paper and allow for more compaction at the same pressure. Figure 8-2 shows compresses paper slugs after dewatering, then drying. From left to right, this shows test pressures from 1000 to 12000 psi.

The testing for switchgrass was the same as the testing done on the samples of paper. There were three tests done on the sample as was done for the paper test, but only the 80 % moisture content testing was done and the 50% moisture content testing was not done. The initial moisture content of the switchgrass as it was received was calculated at 11.1 % moisture content. During the 80% moisture content tests, the amount of water was 800g water to 200g of dry switchgrass sample to make about an 80% moisture content mixture to use for testing. For the test the switchgrass was cut into much smaller pieces before water was added to it, to allow for the same amount of material to take up less space than the uncut material was currently taking up in the tin pans. After compressing the switchgrass sample compressed at 12000 had about the same moisture content percentages as the paper samples did after being compressed at the sample psi pressure. These results would indicate that switchgrass that was extremely wet when compressed at a high compression psi than tested at could be dewatered enough to allow for the materials to be used as fuel (Table 8-2 and Figure 8-3).

Table 8-1. Paper Dewatering Data.

		Paper	Paper	Paper
		Sample 1	Sample 2	Sample 3
	Compres	moisture	moisture	moisture
	Stress	Content	Content	Content
	psi	Wet Basis	Wet Basis	Wet Basis
Test 0	0			
Test 1	1000	43.0%	41.9%	40.5%
Test 2	2000	37.7%	37.1%	34.4%
Test 3	4000	32.9%	32.5%	32.5%
Test 4	8000	31.9%	30.3%	30.0%
Test 5	12000	31.4%	28.4%	28.7%
	50 % MO	Paper	Paper	Paper
		Sample 1	Sample 2	Sample 3
	Compres	moisture	moisture	moisture
	Stress	Content	Content	Content
	psi	Wet Basis	Wet Basis	Wet Basis
Test 0	0			
Test 1	1000	47%	47.0%	46%
Test 2	2000	37%	38.5%	38%
Test 3	4000	33%	33.0%	37%
Test 4	8000	26%	29.0%	31%
Test 5	12000	28%	29.2%	33%

Mechanical Dewatering of **Feedstocks** 50.0% 45.0% 40.0% 35.0% 30.0% 25.0% 20.0% Paper Sample 1 Paper Sample 2 Paper Sample 3 sample 1-50 sample 2-50 15.0% sample 3-50 10.0% 5.0% 0.0% 0 2000 4000 6000 8000 10000 12000 14000 Compressive Stress - psi

Figure 8-1. Compression Dewatering of Paper Samples.



Figure 8-2. Compressed Paper Test Slugs.

Table 8-2. Switch Grass Samples for Compression.

	Switch grass		Switch Grass	Switch Grass
	Sample 1		Sample 2	Sample 3
Compres	moisture		moisture	moisture
Stress	Content		Content	Content
psi	Wet Basis		Wet Basis	Wet Basis
0				
1000		46.20%	47.9%	50.9%
2000		41.50%	56.0%	41.3%
4000		39.10%	39.6%	36.4%
8000		37.00%	37.4%	36.0%
12000		36.30%	34.5%	35.1%

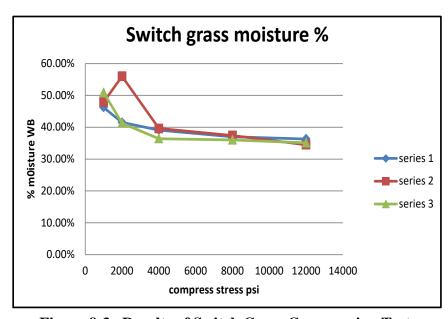


Figure 8-3. Results of Switch Grass Compression Test.

When paper was used the amount of moisture percentage in the remaining dried sample was still too high even in with the psi being between 8,000 to 12,000 when the test was performed it was found that the moisture content was still too high at around 28% moisture content. These results also occurred with the switchgrass tests with the moisture content of the lowest sample after dewatering was 34.5 % moisture content.

After the materials had been dewatered and pressed at the psi test point the slugs that were created were dried in an oven for several hours to remove moisture and to see how well the slugs of the material being tested at that particular moisture content held up when heated. The paper at the 80% test held its shape well, both when it was wet and had been pressed and also when the samples had been exposed to 115 °C (239 °F) heat for 3 to 4 hours to dry them and to see if prolonged drying would reduce the moisture down to 25% or lower. At lower compression psi levels the paper slug was bigger in size and could be broken apart more easily and had a higher moisture content percentage after drying. The higher the compression, the denser the paper slugs, which made breaking them apart much more difficult. The denser paper pellets moisture content was around 26% when compressed to 12,000 compress stress psi or just above the desired 25% moisture content of materials.

With compressing of switchgrass samples the switchgrass held its shape well after it had been compressed while each sample was still wet and had not been dried for several hours. After drying the switchgrass slugs pressed at the first 4 psi test pressures broke when picked up and handled, while the switchgrass sample pressed at 12,000 psi compress stress pressure barely maintained its shape when picked up, but the round shape of the switchgrass slug could still be made out.

With the data showing that even when switchgrass and paper were pressed at a high psi pressure that the amount of moisture pressed out was not lowered enough in terms of moisture percentage in the sample to allow for the materials to be used for burning as a fuel source. Paper at 50% moisture content was able to be dewatered down to the point of having 26% moisture content and that result was created by pressing the paper at 12,000 stress pressure psi limit on the bottle jack gauge. Switch grass had a relatively low initial moisture content percentage as received than paper.

8.4 Equipment and Procedures

Several different types of equipment were used during testing and each had a specific function during the testing procedure. The main piece of equipment used was a bottle jack that had a rated 12 ton load limit capacity and was manufactured by the Central Hydraulic Company. The bottle jack rested on two metal flat weights that then rested on a shop press frame made by the same company that made the bottle jack. The second piece of equipment that was used during testing was an oven that was used to dry samples. The oven was manufactured by Thermo Scientific with the type being the **Precision** model. An electronic scale with a 3,100g capacity was used for measuring all samples weight, the weight of the metal pipes both empty and full of test samples as well as the test samples that have been compressed before drying and the samples weights after drying. Twelve small tin pans were used to hold the compressed sample slugs to allow them to be weighed and then put into the oven with each sample being identifiable by the numbers on each of the pans. Six metal pipe sections were used for the forming of the samples and to hold

the sample in place while they were compressed under different psi loads by the bottle jack. Two five- gallon buckets were used to collect the necessary samples of switchgrass and horse manure while shredded paper material was collected from the local paper recycling box as well as the shredder itself. Two large foil tins or pans depending on what material was being tested were used during finding out the moisture content as collected of the current material type.

Several methods and analytical tools were used in the collection of the data acquired from testing the moisture content percentage on paper both at 50% and 80% moisture content as well as moisture content on switchgrass at 80% and as-received samples of horse manure. The test done to determine the as-received moisture content used the wet basis formula to figure out the moisture percentage from the test material. Once the percentage moisture content was found of the initial material test sample of which a 100g sample from the material being test was taken weighed to get the weight of the sample wet and then dried in an oven for 1 hour to get a dry weight. After this first test was done on each material sample, each material was tested the same way. A 200g sample of paper and 200g sample of switchgrass were mixed with 800g of water to create 80% moisture content sample mixture for testing both types of material samples and 100g of paper and 100g of water were mixed to create the 50% moisture sample. Six pipes were filled with the test material packed down to about a ¼ -in. below the rim surface of the pipe. Each individual pipe was weighed empty to get the tare of the pipe and then with a sample in it to get the gross weight of the sample and pipe. Each sample then had the moisture mechanically pressed out of it by use of a piston and bottle jack setup on the jack press stand. After each sample was dewatered the weight of the sample still in the individual test pipe was taken. The sample was taken out of the pipe and put in a numbered tin pan that had been weighed to get its tare weight. The wet compressed sample was weighed in the pan and the weight of the pan and sample was recorded. The sample was placed in an oven and dried for several hours at 115 °C (239 °F). After drying the sample were weighed again to get a dry weight. The gross weight of the dry sample in the pan minus the tare weight was subtracted from the gross weight of the wet sample in the pan minus the tare weight of the pan. This procedure was done for each of the three sample batches and was done for each of the five compression stress test psi compression levels to get the required data results.

8.5 Conclusions

Paper after testing samples of 80 % moisture content as well as testing of sample composed of a 50% moisture content proved to be the easiest in terms of reducing moisture content around the 25% or under moisture content percentages needed for burning. The highest that paper was compressed at was 12000 compression stress psi pressure and the average moisture content at a 50 % moisture content was 29%. This should mean that any paper products that are to be pressed should be as dry as possible and by doubling the amount of psi pressure used to compress the paper the amount of moisture should be reduced to the point of the moisture percentage being 25% or under. When the tests at 80% and 50% were done different kinds of paper was used. At 80% it was plain shredded office paper, which held and absorbed a lot of moisture and compacted nicely and maintained shaped even after drying and at 50% it was printed thin magazine paper and this absorbed water as well be also allowed for more water to be pressed out of it and that the pressed sample was compressed to an even thinner size. It is recommended that, when compressing paper-based products, the maximum amount of pressure (psi) be used to allow for the greatest amount of moisture to be pressed out. This should result in the lowest

possible moisture percentage and also creates a very dense very dry slug that holds its shape and is great for burning for fuel. In terms of design if by just compressing the materials at a higher psi pressure does not work to bring the moisture content of the materials down to an acceptable moisture content percentage level then a drying device of some form may have to be incorporated into the design plan as well as a some type of grinder for reducing the particle size of the material as its going into the machine to be compressed.

Viewing the graphs and data tables of each of the materials tested and compressed at different moisture content levels and what the graphs show of the data pattern that developed there can be several conclusions made. One that the idea of using mechanical means to dewater materials down to a level of moisture content percentage that allows for full combustion and burning can be done. That a much higher psi pressure has to be used in compressing materials to allows for such a level or moisture content percentage to be reached. Materials such as animal waste may not be suitable for compression by mechanical means at high psi pressure. That the results from these tests on paper, switchgrass and manure can only be used as a baseline for gauging test data results as there may be many kinds of material that may be compressed and dewatered that have much higher or lower as-received moisture contents then the materials tested and hold their shapes and structural integrity better.

9. Conclusions and Implications for Future Research/Implementation

9.1 Conclusions from this Project

The prototype gasification system performed well, in terms of accepting unsorted, realistic waste mixtures, and converting the waste to exportable power. The reactor and system design described in sections 2 and 3 have proven gasification of mixed (unsorted) solid wastes without the need for pre-processing (the requirement for intensive pre-processing in other systems based on downdraft gasification has proven problematic). Additionally, our team demonstrated that our overall system approach destroys waste and produces net-positive electric output. Our new reactor design is a novel gasifier type that meets its purpose.

When we began this project, we did not know what composition of syngas to expect. Most literature describes syngas from downdraft systems, which contain mostly C1 compounds. Our reactor is a modified version of an updraft gasifier. Experimentally, we found our syngas to be much higher in energy than could be accounted for by H₂, CO, and CH₄, etc. Then analytically, we found that the syngas was very similar to commercial liquid fuels (Appendix E). This updraft-like reactor, plus the oil reflux (below) contribute to the favorable overall energy balance.

The oil quench tank described in section 3.5 turned out to be very important to the overall process for a number of reasons. First, it performed its main job of removing tars from the syngas very well. Second, it very effectively, sharply reduced the temperature of the syngas coming out of the reactor, while maintaining itself at a constant temperature. We believe this is due to the entrained, emulsified water that enters the quencher as steam. As long as water is present, it keeps the temperature of the quencher below the boiling point of water. Third, refluxing the accumulating tars and pyro oils back into the gasifier greatly increased the energy content of the syngas (section 4.5.2

9.2 Additional Research Needed

There are several areas of engineering work left before moving towards a long term demonstration at a military site. These include integrating a shredder and automatic waste feed system; establishing redundant PLC logic controls for extra safety; and of course, putting the whole system into shipping containers.

The above items require work, but that work is well understood, using commercial technology. The one significant engineering problem that remains, is determine the most efficient way to introduce syngas into a diesel engine. Appendix C below, gives a detailed discussion of the benefits of using a diesel engine for this application. In short, diesel is more flexible in terms of syngas quality and quantity it will accept; and diesels are the dominant engine type in theater. However, the method of introducing the syngas, used in the project, is problematic. We introduced syngas into the engine air intake via the turbocharger, so the engine uses less liquid fuel because of the energy value in the syngas. This works up to a point, but by doing so, you displace air with the syngas. Therefore the engine becomes starved for oxygen at high rates of syngas feed, which causes the engine to run "rich" and produce soot. You want to maximize the

syngas feed because that means you are maximizing liquid fuel savings, and waste destruction throughput.

To solve this problem may require working with an engine manufacturer to figure out correct gas flow rates and turbo size and pressure to assure that adequate oxygen gets to the engine so it can run cleanly and efficiently (Appendix C).

9.3 Suggested Implementation

The author has participated in the Joint Defense Waste-to-Energy work group (JDW2E), which is hosted by the Navy. This working group is aware of this technology, and it is hoped that this report will generate interest among multiple services. The Air Force Research Lab's periodic WTE workshops have also been brief on this technology.

The prototype system developed under this project was a full scale, proof of concept. It is suitable for short term demonstrations, and SUNY Cobleskill has sought funds for upgrades to make the system more mobile and automated; better for short demonstrations in multiple types of venues.

To move this technology towards DoD contingency operations, the next logical steps would be to construct a new version in a 20-ft container, or three TRICONs, that incorporates all technical lessons-learned from this project, and an automated waste feed system. This version would be suitable for long term military testing at a location such as the Contingency Basing Integration Technology Evaluation Center at Fort Leonard Wood, MO – also the home of the Engineer School. There, the gasifier could be run and observed by soldiers in training; soldier waste disposal would be somewhat realistic; and the power output could be monitored and integrated into the camp micro-grid. There's another test center at Tyndall Air Force Base (AFB), which has hosted WTE demonstrations and a containerized system, could easily be moved there for Air Force exposure.

Once we are in a position for long term demonstration, it will be time to engage with PM-E2S2 to work on a formal technology transfer agreement.

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Appendices

Appendix A: Points of Contact

Point of Contact	Organization	Phone & E-mail	Role in Project
Mr. Stephen D. Cosper	U.S. Army ERDC-CERL	217-398-5569 Stephen.D.Cosper@usace.army.mil	Project Manager
	SUNY Cobleskill Center for Environmental Science and Technology		PI for technology development

Appendix B: Supporting Data Derived from Syngas Analysis Reports

The following pages shows initial GC work and calorific data for syngas samples during a series of IIFPRG trials in November 2013, processing a variety of feedstocks. Table B-1 summarizes this data by feedstock. For the measured HHV, the syngas was passed through a calorimeter and therefore includes all gases present, i.e., those not capture in the initial GC data which only looked for C1 species. Subsequent GC work (Appendix E) measures the full extent of organics.

Table B-1. GC Data Summary.

Feedstock into IIFPRG	Vol. % H ₂	Vol. % O2	Vol. % N₂	Vol. % CH₄	Vol. % CO	Vol. % CO ₂	Measured HHV (BTU/SCF)
70% woodchips, 30% rubber by weight	5.7	2.1	62.3	1.2	21.5	7.2	99.5
50% Cafeteria waste (wet food, liquids, plastic wrappers, packaging); 50% wood chips	5.8	1.7	59.0	1.5	23.9	8.2	111.5
Woodchips	6.8	2.1	60.2	1.8	22.3	9.0	104.1
70% woodchips, 30% HDPE	5.4	1.9	60.8	1.8	20.1	7.6	100.5
Pine chips	6.0	2.6	61.6	1.7	17.3	10.8	92.5





Sample No.:	SB112113-1455
Sample Date:	11/21/2013
Sample Description:	IIRPG, 70% Cooksburg wood chips, 30% rubber by weight, 113 BTU on Caloryo
Analysis Date:	11/21/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	4.8%	4.8%	0.3%
Oxygen	02	2.8%	2.8%	3.2%
Nitrogen	N2	63.9%	63.9%	64.3%
Methane	CH4	1.0%	1.0%	%9.0
Carbon Monoxide	00	20.8%	20.8%	21.0%
Carbon Dioxide	C02	6.7%	6.7%	10.6%
Water	H20	%0.0	%0.0	%0.0
Acetylene	CZHZ	%0.0	%0.0	%0.0
Ethylene	C2H4	%0.0	%0.0	%0.0
Ethane	С2Н6	%0.0	%0.0	%0.0

STOICHIC	Juetne L	Stoichiometric Combustion Products:
200	0.345	0.345 Ib per lb of combustible
H20	0.044	0.044 Ib per Ib of combustible
N2	0.565	0.565 Ib per Ib of combustible
C02	0.218	0.218 ft^3 per ft^3 of combustible
Н20	890.0	0.068 ft^3 per ft^3 of combustible
513	2000	O COT CAN LAND A COLUMN

Molecular Weight - MW	27.83	
Resultant Gas Constant - R	55.52	55.52 Ft-lbf/lbm/R
Specific Gravity - SG	0.961	
Density at 70 F & 14.7 psia	0.0720	0.0720 Ibm/ft^3
Ratio of Specific Heats - k	1.3868	Cp/Cv
Critical Pressure Ratio - CPR	0.5198	
High Heating Value - HHV	93	BTU/SCF
Low Heating Value - LHV	89	BTU/SCF
Stoichometric Air:Fuel Ratio	0.704	by Volume
Stoichometric Air:Fuel Ratio	0.656	by Mass
Low Flammability Limit in Air	2.8%	IRI
High Flammability Limit in Air	19.2%	HFL
Auto lenition Temperature	1.091	1.091 deg F

Technician Initials:	XXI	
Report Date:	11/22/2013	





Sample No.:	SB112113-1150
Sample Date:	11/21/2013
Sample Description:	IIRGP, 50% Cafeteria Waste, 50% Cooksburg wood chips, 127 BTU on Calorval
Analysis Date:	11/21/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	6.3%	6.3%	0.5%
Oxygen	05	1.0%	1.0%	1.2%
Nitrogen	N2	27.6%	27.6%	28.6%
Methane	СН4	1.6%	1.6%	%6.0
Carbon Monoxide	8	25.1%	25.1%	25.5%
Carbon Dioxide	CO2	8.3%	8.3%	13.3%
Water	H20	%0.0	0.0%	%0'0
Acetylene	C2H2	%0'0	%0.0	%0.0
Ethylene	C2H4	%0.0	0.0%	%0.0
Ethane	С2Н6	%0.0	%0.0	%0.0

100%

Total =

2000	THE CHILL	Scott Holleting Collings doi: 11 October 5.
CO2	0.427	0.427 Ib per Ib of combustible
H20	0.063	0.063 lb per lb of combustible
N2	0.733	0.733 lb per lb of combustible
C02	0.267	0.267 ft^3 per ft^3 of combustible
H20	960'0	0.096 ftv3 per ftv3 of combustible
CIN	A150	0 74 A LAA3 nor GAA3 of combinetible

Manipular Maint AM	27 55	
MINISTRIP MEIRINA	CC-17	
Resultant Gas Constant - R	56.10	Ft-Ibf/Ibm/R
Specific Gravity - SG	0.951	
Density at 70 F & 14.7 psia	0.0713	0.0713 lbm/ft^3
Ratio of Specific Heats - k	1.3833	Cp/Cv
Critical Pressure Ratio - CPR	0.5166	
High Heating Value - HHV	118	BTU/SCF
Low Heating Value - LHV	113	BTU/SCF
Stoichometric Air:Fuel Ratio	0.904	by Volume
Stoichometric Air:Fuel Ratio	0.848	by Mass
Low Flammability Limit in Air	3.5%	LPL.
High Flammability Limit in Air	23.6%	HFL
Auto Ignition Temperature	1 088	1 088 dev F





Sample No.:	SB112113-1217
Sample Date:	11/21/2013
Sample Description:	IIRGP, 50% Cafeteria Waste, 50% Cooksburg wood chips, 124 BTU on Calorval
Analysis Date:	11/21/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	5.3%	5.3%	0.4%
Oxygen	05	2.3%	2.3%	7.6%
Nitrogen	N2	60.3%	60.3%	%9.09
Methane	СН4	1.4%	1.4%	0.8%
Carbon Monoxide	8	22.7%	22.7%	22.8%
Carbon Dioxide	CO2	8.1%	8.1%	12.7%
Water	H20	%0.0	0.0%	%0.0
Acetylene	C2H2	%0'0	%0.0	%0.0
Ethylene	C2H4	%0.0	%0.0	%0.0
Ethane	С2Н6	%0.0	%0.0	%0.0

SCOICE	MILETING C	Stole Holliethic Compassion Products.
CO2	0.381	0.381 Ib per Ib of combustible
H20	0.053	0.053 Ib per Ib of combustible
N2	0.643	0.643 lb per lb of combustible
C02	0.241	0.241 ft^3 per ft^3 of combustible
H20	0.081	0.081 ft^3 per ft^3 of combustible
CN	0.633	0 633 6443 per 6443 of combustible

Calculated Values:

Molecular Weight - MW	27.84	
Resultant Gas Constant - R	55.51	Ft-lbf/lbm/R
Specific Gravity - SG	0,961	
Density at 70 F & 14.7 psia	0.0721	0.0721 lbm/ft^3
Ratio of Specific Heats - k	1.3841	Cp/Cv
Critical Pressure Ratio - CPR	0.5194	
High Heating Value - HHV	105	BTU/SCF
Low Heating Value - LHV	100	BTU/SCF
Stoichometric Air:Fuel Ratio	0.801	by Volume
Stoichometric Air:Fuel Ratio	0.748	by Mass
Low Flammability Limit in Air	3.1%	LFL.
High Flammability Limit in Air	21.0%	HFL
Auto Ignition Temperature	1.090	1.090 deg F

Technician Initials:	JTX	
Report Date:	11/22/2013	





Sample No.:	SB112113-1335
Sample Date:	11/21/2013
Sample Description:	IIRPG, 70% Cooksburg wood chips, 30% rubber by weight, 133 BTU on Calorya
Analysis Date:	11/21/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	6.5%	6.5%	0.5%
Oxygen	05	1.3%	1.3%	1.6%
Nitrogen	N2	%2'09	%4.09	61.9%
Methane	CH4	1.4%	1.4%	%8.0
Carbon Monoxide	8	22.1%	22.1%	22.6%
Carbon Dioxide	C02	7.6%	7.6%	12.2%
Water	H20	%0.0	0.0%	%0.0
Acetylene	C2H2	0.4%	0.4%	0.4%
Ethylene	C2H4	%0.0	%0.0	%0.0
Ethane	С2Н6	%0.0	%0.0	%0.0

SUDICIN	Juletille C	Stole Home Life Compassion Products.
CO2	0.377	0.377 Ib per Ib of combustible
H20	090'0	0.060 lb per lb of combustible
N2	0.660	0.660 Ib per lb of combustible
C02	0.243	0.243 ft^3 per ft^3 of combustible
H20	960'0	0.096 ft^3 per ft^3 of combustible
N2	0.680	0.680 HAR per HAR of combuctible

Calculated Values.		
Molecular Weight - MW	27.44	
Resultant Gas Constant - R	56.32	Ft-lbf/lbm/R
Specific Gravity - SG	0.947	
Density at 70 F & 14.7 psia	0.0710 lbm/ft ^{A3}	lbm/ft^3
Ratio of Specific Heats - k	1.3843	Cp/Cv
Critical Pressure Ratio - CPR	0.5157	
High Heating Value - HHV	106	BTU/SCF
Low Heating Value - LHV	101	BTU/SCF
Stoichometric Air:Fuel Ratio	0.810	by Volume
Stoichometric Air: Fuel Ratio	0.750	by Mass
Low Flammability Limit in Air	3.1%	LFL
High Flammability Limit in Air	21.8%	HFL
Auto Ignition Temperature	1,092 deg F	deg F

Technician Initials:	XXI	
Report Date:	11/22/2013	





Sample No.:	SB112113-1110
Sample Date:	11/21/2013
Sample Description:	IIRPG, Cooksburg wood chips, 121 BTU on Calorval
Analysis Date:	11/21/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	6.4%	6.4%	0.5%
Oxygen	05	1.7%	1.7%	1.9%
Nitrogen	N2	58.5%	58.5%	59.4%
Methane	CH4	1.6%	1.6%	%6.0
Carbon Monoxide	8	23.2%	23.2%	23.6%
Carbon Dioxide	C02	8.6%	8.6%	13.7%
Water	H20	%0.0	%0.0	%0.0
Acetylene	C2H2	%0.0	%0.0	%0.0
Ethylene	C2H4	%0.0	%0.0	%0.0
Ethane	С2Н6	%0.0	0.0%	%0.0

100%
100%
100%
Total =

Calculated Values:

Molecular Weight - MW	27.60	
Resultant Gas Constant - R	56.00	Ft-lbf/lbm/R
Specific Gravity - SG	0.953	
Density at 70 F & 14.7 psia	0.0714	0.0714 lbm/ft^3
Ratio of Specific Heats - k	1.3829	Cp/Cv
Critical Pressure Ratio - CPR	0.5170	
High Heating Value - HHV	112	BTU/SCF
Low Heating Value - LHV	107	BTU/SCF
Stoichometric Air; Fuel Ratio	0.860	by Volume
Stoichometric Air: Fuel Ratio	0.800	by Mass
Low Flammability Limit in Air	3.2%	LFL.
High Flammability Limit in Air	22.2%	HFL
Auto Ignition Temperature	1,085	1,085 deg F

chnician Initials:	XL
port Date:	11/22/2013

705	0.396	0.396 Ib per Ib of combustible
H20	0.063	0.063 Ib per Ib of combustible
12	0.697	0.697 Ib per lb of combustible





Sample No.:	SB112113-1030
Sample Date:	11/21/2013
Sample Description:	IIRPG, Cooksburg wood chips, 121 BTU on calorval
Analysis Date:	11/21/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	6.2%	6.2%	0.4%
Oxygen	05	2.0%	2.0%	2.3%
Nitrogen	N2	58.5%	58.5%	58.7%
Methane	CH4	2.1%	2.1%	1.2%
Carbon Monoxide	8	20.4%	20.4%	20.5%
Carbon Dioxide	C02	10.7%	10.7%	16.8%
Water	H20	%0.0	0.0%	%0'0
Acetylene	C2H2	%0'0	%0.0	%0.0
Ethylene	C2H4	%0.0	0.0%	%0.0
Ethane	С2Н6	%0.0	%0.0	%0.0

0.225 ftv3 per ftv3 of combustible 0.104 ftv3 per ftv3 of combustible 0.660 ftv3 per ftv3 of combustible

0.355 lb per lb of combustible 0.067 lb per lb of combustible 0.669 lb per lb of combustible

Stoichiometric Combustion Products:

%
100%
100%
100%
Total =

Calculated Values:

Molecular Weight - MW	27.93	
Resultant Gas Constant - R	55.33	Ft-lbf/lbm/R
Specific Gravity - SG	0,964	
Density at 70 F & 14.7 psia	0.0723	0.0723 Ibm/ft ^A 3
Ratio of Specific Heats - k	1,3789	cp/cv
Critical Pressure Ratio - CPR	0.5196	
High Heating Value - HHV	107	BTU/SCF
Low Heating Value - LHV	102	BTU/SCF
Stoichometric Air:Fuel Ratio	0.836	by Volume
Stoichometric Air:Fuel Ratio	192'0	by Mass
Low Flammability Limit in Air	2.9%	LFL.
High Flammability Limit in Air	20.1%	HFL
Auto Ignition Temperature	1.082	1.082 deg F

Technician Initials:	XL	
Report Date:	11/22/2013	





Sample No.:	SB112013-1400
Sample Date:	11/20/2013
Sample Description:	IIRPG, 70% Cooksburg wood chips, 30% HDPE by weight, 181 BTU on Calorval
Analysis Date:	11/20/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	5.7%	5.7%	0.4%
Oxygen	05	2.7%	2.7%	3.1%
Nitrogen	N2	29.9%	29.9%	61.1%
Methane	CH4	2.2%	2.2%	1.3%
Carbon Monoxide	8	19.2%	19.2%	19.5%
Carbon Dioxide	CO2	%6'9	%6.9	11.0%
Water	H20	%0.0	%0.0	%0'0
Acetylene	C2H2	%0'0	%0.0	%0.0
Ethylene	C2H4	3.5%	3.5%	3.6%
Ethane	C2H6	%0.0	%0.0	%0.0

2000	The state of	Scott House the College of the Courts.
C02	0.342	0.342 Ib per Ib of combustible
H20	990.0	0.066 Ib per Ib of combustible
N2	0.650	0.650 Ib per lb of combustible
C02	0.284	0.284 ft^3 per ft^3 of combustible
H20	0.171	0.171 ft^3 per ft^3 of combustible
CIN	1 020	1 020 AA3 nor GA3 of comburtible

Calculated Values.		
Molecular Weight - MW	27.48	
Resultant Gas Constant - R	56.23	Ft-lbf/lbm/R
Specific Gravity - SG	0.949	
Density at 70 F & 14.7 psia	0.0711 lbm/ft ⁿ³	lbm/ft^3
Ratio of Specific Heats - k	1.3801	Cp/Cv
Critical Pressure Ratio - CPR	0.5156	
High Heating Value - HHV	102	BTU/SCF
Low Heating Value - LHV	26	BTU/SCF
Stoichometric Air:Fuel Ratio	0.800	by Volume
Stoichometric Air:Fuel Ratio	0.751	by Mass
Low Flammability Limit in Air	3.0%	LFL
High Flammability Limit in Air	19.3%	HFL
Auto Ignition Temperature	1,202 deg F	deg F

nician Initials:	XL
ort Date:	11/21/2013





Sample No.:	SB112013-1330
Sample Date:	11/20/2013
Sample Description:	IIRPG, 70% Cooksburg wood chips, 30% High Density Poly Ethylene by weight, 142 BTU on Calony
Analysis Date:	11/20/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	5.1%	5.1%	0.4%
Oxygen	02	1.0%	1.0%	1.1%
Nitrogen	N2	61.6%	61.6%	62.0%
Methane	CH4	1.4%	1.4%	0.8%
Carbon Monoxide	8	21.0%	21.0%	21.1%
Carbon Dioxide	CO2	8.2%	8.2%	13.0%
Water	H20	%0.0	%0.0	%0.0
Acetylene	C2H2	1.6%	1.6%	1.5%
Ethylene	C2H4	%0.0	%0.0	%0.0
Ethane	С2Н6	%0.0	0.0%	%0.0

SEDICUI	ometric C	Stoichiometric Compustion Products:
CO2	0.354	0.354 Ib per Ib of combustible
H20	0.052	0.052 Ib per lb of combustible
N2	0.608	0.608 Ib per lb of combustible
C02	0.256	0.256 ft^3 per ft^3 of combustible
H20	0.096	0.096 ftv3 per ftv3 of combustible
CIN	0 748	0 748 4443 nor 4443 of combuctible

Calculated Values:		
Molecular Weight - MW	27.83	
Resultant Gas Constant - R	55.52	Ft-lbf/lbm/R
Specific Gravity - SG	0.961	
Density at 70 F & 14.7 psia	0.0720	0.0720 lbm/ft^3
Ratio of Specific Heats - k	1.3823 Cp/Cv	Cp/Cv
Critical Pressure Ratio - CPR	0.5192	
High Heating Value - HHV	66	BTU/SCF
Low Heating Value - LHV	95	BTU/SCF
Stoichometric Air:Fuel Ratio	0.757	by Volume
Stoichometric Air: Fuel Ratio	0.705	by Mass
Low Flammability Limit in Air	2.9%	LFL
the table to the Atlanta	700 00	1100

Technician Initials:	XL	
Report Date:	11/21/2013	





Sample No.:	SB112013-1245
Sample Date:	11/20/2013
Sample Description:	IIRPG, Cooksburg wood chips, 141 BTU on calorval
Analysis Date:	11/20/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	7.4%	7.4%	%5'0
Oxygen	05	1.2%	1.2%	1.4%
Nitrogen	N2	26.0%	26.0%	57.2%
Methane	CH4	2.2%	2.2%	1.3%
Carbon Monoxide	8	23.1%	23.1%	23.6%
Carbon Dioxide	C02	%9.6	%9.6	15.5%
Water	H20	%0.0	0.0%	%0.0
Acetylene	C2H2	0.5%	0.5%	0.4%
Ethylene	C2H4	%0.0	%0.0	%0.0
Ethane	С2Н6	%0.0	%0.0	%0.0

0.262 ftv3 per ftv3 of combustible 0.122 ftv3 per ftv3 of combustible 0.780 ftv3 per ftv3 of combustible

0.406 |b per lb of combustible 0.077 |b per lb of combustible 0.760 |b per lb of combustible

Stoichiometric Combustion Products:

0.0%	0.0%	CZHA	0.0%	0.0%	%0.0
		CZH6	20.0	0.0%	0.0%

Calculated Values:

Molecular Weight - MW		
	27.41	
Resultant Gas Constant - R	56.38	Ft-lbf/lbm/R
Specific Gravity - SG	0,946	
Density at 70 F & 14.7 psia	0.0709 Ibm/ft ^{^3}	lbm/ft^3
Ratio of Specific Heats - k	1.3801	Cp/Cv
Critical Pressure Ratio - CPR	0.5149	
High Heating Value - HHV	120	BTU/SCF
Low Heating Value - LHV	114	BTU/SCF
Stoichometric Air:Fuel Ratio	0.933	by Volume
Stoichometric Air:Fuel Ratio	0.865	by Mass
Low Flammability Limit in Air	3.3%	LPL.
High Flammability Limit in Air	23.5%	HFL
Auto Ignition Temperature	1,088	1,088 deg F

echnician Initials:	XL	
eport Date:	11/21/2013	





Sample No.:	SB111913-1515
Sample Date:	11/19/2013
Sample Description:	IIRPG, Cooksburg wood chips, 143 BTU on calorval
Analysis Date:	11/19/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	7.8%	7.8%	%9.0
Oxygen	05	1.1%	1.1%	1.3%
Nitrogen	N2	54.9%	54.9%	26.7%
Methane	СН4	2.1%	2.1%	1.2%
Carbon Monoxide	8	25.5%	25.5%	26.3%
Carbon Dioxide	C02	8.3%	8.3%	13.5%
Water	H20	%0.0	0.0%	%0.0
Acetylene	C2H2	0.3%	0.3%	0.3%
Ethylene	C2H4	%0.0	%0.0	%0.0
Ethane	С2Н6	%0.0	0.0%	%0.0

2.1.1	26.3%	13.5%	%0.0	0.3%	%0.0	%0.0		2000
	25.5%	8.3%	%0.0	0.3%	%0.0	%0.0	70000	7000
	25.5%	8.3%	%0.0	0.3%	%0.0	%0.0	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	74
1	00	C02	H20	C2H2	C2H4	C2H6		

0.282 ftv3 per ftv3 of combustible 0.123 ftv3 per ftv3 of combustible 0.817 ftv3 per ftv3 of combustible

0.447 Ib per lb of combustible 0.080 Ib per lb of combustible 0.818 Ib per lb of combustible

CO2 H2O N2

Stoichiometric Combustion Products:

Molecular Weight - MW	27.11	
Resultant Gas Constant - R	57.01	Ft-lbf/lbm/R
Specific Gravity - SG	986'0	
Density at 70 F & 14.7 psia	0.0702	0.0702 Ibm/ft^3
Ratio of Specific Heats - k	1.3825	cp/cv
Critical Pressure Ratio - CPR	0.5124	
High Heating Value - HHV	129	BTU/SCF
Low Heating Value - LHV	123	BTU/SCF
Stoichometric Air; Fuel Ratio	0.992	by Volume
Stoichometric Air:Fuel Ratio	0.932	by Mass
Low Flammability Limit in Air	3.6%	LFL.
High Flammability Limit in Air	25.3%	HFL
Auto Ignition Temperature	1.087	1.087 deg F

Technician Initials:	JTX	
Report Date:	11/20/2013	





Sample No.:	SB111913-1440
Sample Date:	11/19/2013
Sample Description:	IIRPG, Cooksburg wood chips, 142 BTU on calorval
Analysis Date:	11/19/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	7.9%	7.9%	%9.0
Oxygen	05	1.1%	1.1%	1.3%
Nitrogen	N2	55.4%	55.4%	26.7%
Methane	CH4	2.2%	2.2%	1.3%
Carbon Monoxide	8	22.5%	22.5%	23.0%
Carbon Dioxide	C02	10.2%	10.2%	16.4%
Water	H20	%0.0	%0.0	%0'0
Acetylene	C2H2	%8.0	%8.0	0.7%
Ethylene	C2H4	%0.0	%0.0	%0.0
Ethane	C2H6	%0.0	0.0%	%0.0

100%	
100%	
100%	
Total =	

Molecular Weight - MW 57.36

Molecular Weight - MW 56.49

Resultant Gas Constant - R 56.49

Specific Gravity - SG 0.944

Density at 70 F & 14.7 psia 0.0708

Ratio of Specific Heats - K 1.3787

Critical Pressure Ratio - CPR 0.5142

High Heating Value - LHV 1.20

Stoichometric Air: Fuel Ratio 0.0932

Stoichometric Air: Fuel Ratio 0.932

Low Hammability Limit in Air 23.6%

High Flammability Limit in Air 23.6%

Auto Ignition Temperature 1.091

Auto Ignition Temperature 1.091

Application Security 1.008

Stoichometric Air: Fuel Ratio 1.087

Auto Ignition Temperature 1.091

Low Flammability Limit in Air 1.091

Auto Ignition Temperature 1.091

Low Flammability Limit in Air 1.091

Auto Ignition Temperature 1.091

Low Flammability Limit in Air 1.091

Auto Ignition Temperature 1.091

XTL	11/20/2013
Technician Initials:	Report Date:

C02	0.397	0.397 Ib per Ib of combustible
H20	0.081	0.081 Ib per lb of combustible
N2	0.761	0.761 Ib per lb of combustible
CO2	0.262	0.262 ft^3 per ft^3 of combustible
H20	0.130	0.130 ft^3 per ft^3 of combustible
N2	0.808	0.808 ft^3 per ft^3 of combustible





Sample No.:	SB111913-1415
Sample Date:	11/19/2013
Sample Description:	IIRPG, Cooksburg wood chips, 140 BTU on calorval
Analysis Date:	11/19/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	8.2%	8.2%	%9.0
Oxygen	05	1.6%	1.6%	1.9%
Nitrogen	N2	25.0%	25.0%	26.5%
Methane	CH4	2.2%	2.2%	1.3%
Carbon Monoxide	8	22.6%	22.6%	23.2%
Carbon Dioxide	C02	%6.6	%6.6	15.9%
Water	H20	%0.0	0.0%	%0.0
Acetylene	C2H2	%9'0	%9.0	%9.0
Ethylene	C2H4	%0.0	%0.0	%0.0
Ethane	С2Н6	%0.0	%0.0	%0.0

7	8.2%	8.7%	0.6%
2	1.6%	1.6%	1.9%
2	25.0%	55.0%	26.5%
14	2.2%	2.2%	1.3%
0	22.6%	22.6%	23.2%
12	%6'6	%6.6	15.9%
0	%0.0	%0.0	%0.0
C2H2	%9'0	%9.0	%9.0
14	%0.0	%0.0	%0.0
91	%0.0	%0.0	%0.0

0.260 ftv3 per ftv3 of combustible 0.131 ftv3 per ftv3 of combustible 0.800 ftv3 per ftv3 of combustible

0.400 |b per lb of combustible 0.082 |b per lb of combustible 0.769 |b per lb of combustible

Stoichiometric Combustion Products:

Molecular Weight - MW	27.27	
Resultant Gas Constant - R	26.68	Ft-lbf/lbm/R
Specific Gravity - SG	0.941	
Density at 70 F & 14.7 psia	0.0706	0.0706 lbm/ft ^{A3}
Ratio of Specific Heats - k	1.3794	Cp/Cv
Critical Pressure Ratio - CPR	0.5135	
High Heating Value - HHV	121	BTU/SCF
Low Heating Value - LHV	115	BTU/SCF
Stoichometric Air; Fuel Ratio	0.938	by Volume
Stoichometric Air:Fuel Ratio	0.862	by Mass
Low Flammability Limit in Air	3.3%	LFL.
High Flammability Limit in Air	23.8%	HFL
Auto Ignition Temperature	1.087 deg F	der F

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Auto Ignition Temperature	1,087 deg	deg F
Technician Initials:		





Sample No.:	SB111913-1345
Sample Date:	11/19/2013
Sample Description:	IIRPG, Cooksburg wood chips, 128 BTU on calorval
Analysis Date:	11/19/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	7.2%	7.2%	0.5%
Oxygen	02	2.5%	2.5%	7.9%
Nitrogen	N2	57.4%	57.4%	57.9%
Methane	CH4	2.3%	2.3%	1.3%
Carbon Monoxide	00	18.7%	18.7%	18.9%
Carbon Dioxide	C02	11.3%	11,3%	17.8%
Water	H20	%0.0	%0.0	%0.0
Acetylene	C2H2	%9'0	%9.0	%9.0
Ethylene	C2H4	%0.0	%0.0	%0.0
Ethane	С2Н6	%0.0	%0.0	0.0%

0.4.7	2.5% 2.5% 2.9%	57.4%	2.3%	18.7%	11,3%		%9:0		%0.0 %0.0 %0.0	100% 100% 100%
711	02	N2	СН4	00	C02	H20	C2H2	C2H4	С2Н6	Total =

Calculated Values:

Molecular Weight - MW	27.77	
Resultant Gas Constant - R	55.65	Ft-lbf/lbm/R
Specific Gravity - SG	656'0	
Density at 70 F & 14.7 psia	0.0719	0.0719 lbm/ft^3
Ratio of Specific Heats - k	1.3770	cp/cv
Critical Pressure Ratio - CPR	0.5179	
High Heating Value - HHV	107	вти/scғ
Low Heating Value - LHV	101	BTU/SCF
Stoichometric Air; Fuel Ratio	0.835	by Volume
Stoichometric Air:Fuel Ratio	0.755	by Mass
Low Flammability Limit in Air	2.8%	LFL.
High Flammability Limit in Air	20.2%	HFL
Auto Ignition Temperature	1,087	1.087 deg F

XL	11/20/2013
Technician Initials:	Report Date:

05	0.223	£43	per f	23	to	0.223 ft^3 per ft^3 of combustible
420	0.124	ftv3	per f	£43	70	0.124 ft^3 per ft^3 of combustible
2	0.719	fr3	per f	23	70	0.719 ft^3 per ft^3 of combustible





Sample No.:	SB102413-1310
Sample Date:	10/24/2013
Sample Description:	IIRPG, Campus Pine Chips, Shortly after blower overload, 99 BTU on Calorval
Analysis Date:	10/24/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	3.6%	3.6%	0.3%
Oxygen	02	1.2%	1.2%	1.3%
Nitrogen	N2	66.1%	66,1%	64.5%
Methane	CH4	1.5%	1.5%	0.8%
Carbon Monoxide	8	15.6%	15.6%	15.2%
Carbon Dioxide	C02	11.3%	11.3%	17.3%
Water	H20	%0.0	%0.0	%0.0
Acetylene	C2H2	0.7%	0.7%	%9'0
Ethylene	C2H4	%0.0	%0.0	%0.0
Ethane	С2Н6	%0.0	%0.0	%0.0

SUBICINE	Juleun C	Stole Homeline Compassion Products.
C02	0.262	0.262 Ib per Ib of combustible
H20	0.041	0.041 Ib per lb of combustible
N2	0.467	0.467 Ib per Ib of combustible
C02	0.185	0.185 ft^3 per ft^3 of combustible
H20	0.073	0.073 ftv3 per ft ^{A3} of combustible
N2	0.541	0 541 HAR nor HAR of combustible

And the Charles and	20.00	
Molecular Weight - MIW	28./3	
Resultant Gas Constant - R	53.78	Ft-Ibf/Ibm/R
Specific Gravity - SG	0.992	
Density at 70 F & 14.7 psia	0.0744	0.0744 lbm/ft^3
Ratio of Specific Heats - k	1.3780	Cp/Cv
Critical Pressure Ratio - CPR	0.5269	
High Heating Value - HHV	77	BTU/SCF
Low Heating Value - LHV	74	BTU/SCF
Stoichometric Air:Fuel Ratio	0.600	by Volume
Stoichometric Air:Fuel Ratio	0.549	by Mass
Low Flammability Limit in Air	2.2%	LFL.
High Flammability Limit in Air	15.2%	HFL
Auto Ignition Temperature	1 110	1 110 der E

Fechnician Initials:	XL	
Report Date:	10/24/2013	





Sample No.:	SB102413-1245
Sample Date:	10/24/2013
Sample Description:	IIRPG, Campus Pine Chips, 111 BTU on Calorval
Analysis Date:	10/24/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	2.5%	5.5%	0.4%
Oxygen	02	1.4%	1.4%	1.6%
Nitrogen	N2	60.5%	60,5%	%5'09
Methane	CH4	1.8%	1.8%	1.0%
Carbon Monoxide	8	20.0%	20.0%	20.0%
Carbon Dioxide	C02	10.0%	10.0%	15.7%
Water	H20	%0.0	%0.0	%0'0
Acetylene	C2H2	%8.0	%8.0	%8.0
Ethylene	C2H4	%0.0	%0.0	%0.0
Ethane	С2Н6	%0.0	0.0%	%0.0

			-
C02	10.0%	10.0%	15.7%
H20	%0'0	%0.0	%0.0
C2H2	%8.0	%8.0	%8.0
C2H4	%0.0	%0.0	%0.0
С2Н6	%0.0	%0.0	%0.0
Total =	100%	100%	100%

0.234 ftv3 per ftv3 of combustible 0.098 ftv3 per ftv3 of combustible 0.689 ftv3 per ftv3 of combustible

0.342 lb per lb of combustible 0.058 lb per lb of combustible 0.619 lb per lb of combustible

CO2 H2O N2

Stoichiometric Combustion Products:

Calculated Values:

Molecular Weight - MW	28.02	
Resultant Gas Constant - R	55.16	Ft-lbf/lbm/R
Specific Gravity - SG	196'0	
Density at 70 F & 14.7 psia	0.0725	0.0725 lbm/ft^3
Ratio of Specific Heats - k	1.3796	Cp/Cv
Critical Pressure Ratio - CPR	0.5205	
High Heating Value - HHV	100	BTU/SCF
Low Heating Value - LHV	96	BTU/SCF
Stoichometric Air:Fuel Ratio	0.776	by Volume
Stoichometric Air:Fuel Ratio	0.715	by Mass
Low Flammability Limit in Air	2.8%	LFI.
High Flammability Limit in Air	20.0%	HFL
Auto Ignition Temperature	1.102 deg F	deg F

chnician Initials:	хц	
port Date:	10/24/2013	





Sample No.:	SB102413-1210
Sample Date:	10/24/2013
Sample Description:	IIRPG, Campus Pine Chips, 103 BTU on Calorval
Analysis Date:	10/24/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	4.6%	4.6%	0.3%
Oxygen	05	1.7%	1.7%	1.9%
Nitrogen	N2	63.3%	63.3%	62.2%
Methane	СН4	1.4%	1.4%	%8.0
Carbon Monoxide	8	17.9%	17.9%	17.7%
Carbon Dioxide	C02	11.1%	11,1%	17.1%
Water	H20	%0.0	0.0%	%0.0
Acetylene	C2H2	%0'0	%0.0	%0.0
Ethylene	С2Н4	%0.0	%0.0	%0.0
Ethane	C2H6	%0.0	0.0%	%0.0

100%
7001
100%
Total =

Molecular Weight - MW	28.48	
Resultant Gas Constant - R	54.26	Ft-lbf/lbm/R
Specific Gravity - SG	0,983	
Density at 70 F & 14.7 psia	0.0737	0.0737 Ibm/ft^3
Ratio of Specific Heats - k	1.3789	Cp/Cv
Critical Pressure Ratio - CPR	0.5247	
High Heating Value - HHV	87	BTU/SCF
Low Heating Value - LHV	83	BTU/SCF
Stoichometric Air:Fuel Ratio	899.0	by Volume
Stoichometric Air:Fuel Ratio	0.607	by Mass
Low Flammability Limit in Air	2.5%	LPL .
High Flammability Limit in Air	17.0%	HFL
Auto Ignition Temperature	1.087	1.087 deg F

JTX 10/34/2013	10/24/2013
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SUDICINE	SCORE HOLLEGILL COMPANDING PRODUCTS.	ocuces.
CO2	0.298 Ib per Ib of combustible	ombustible
H20	0.047 Ib per Ib of combustible	ombustible
N2	0.524 Ib per Ib of combustible	ombustible
C02	0.193 ft^3 per ft^3 of combustible	of combustible
H20	0.074 ft^3 per ft^3 of combustible	of combustible





Sample No.:	SB102413-1110
Sample Date:	10/24/2013
Sample Description:	IIRPG, Campus Pine Chips, 124 BTU on Calorval
Analysis Date:	10/24/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	8.4%	8.4%	%9.0
Oxygen	02	1.9%	1.9%	2.2%
Nitrogen	N2	57.4%	57.4%	28.5%
Methane	CH4	2.1%	2.1%	1.2%
Carbon Monoxide	8	19.0%	19.0%	19.4%
Carbon Dioxide	C02	11.3%	11,3%	18.1%
Water	H20	%0.0	%0.0	%0.0
Acetylene	C2H2	%0'0	%0.0	%0.0
Ethylene	C2H4	%0.0	%0.0	%0.0
Ethane	С2Н6	%0.0	%0.0	%0.0

Molecular Weight - MW	27.47	
Resultant Gas Constant - R	56.26	Ft-lbf/lbm/R
Specific Gravity - SG	0,948	
Density at 70 F & 14.7 psia	0.0711	0.0711 lbm/ft^3
Ratio of Specific Heats - k	1.3774	Cp/Cv
Critical Pressure Ratio - CPR	0.5151	
High Heating Value - HHV	110	BTU/SCF
Low Heating Value - LHV	103	BTU/SCF
Stoichometric Air; Fuel Ratio	0.852	by Volume
Stoichometric Air:Fuel Ratio	0.761	by Mass
Low Flammability Limit in Air	2.8%	LFL.
High Flammability Limit in Air	20.6%	HFL
Auto Ignition Temperature	1.069	1.069 deg F

05	0.211	fr/3	0.211 ft^3 per ft^3 of combustible	nbustible
20	0.126	ftv3	0.126 ft^3 per ft^3 of combustible	nbustible
2	0.673	ftv3 p	per ft^3 of combustible	nbustible





Sample No.:	SB102413-1055
Sample Date:	10/24/2013
Sample Description:	IIRPG, Campus Pine Chips, 105 BTU on calorval
Analysis Date:	10/24/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	7.1%	7.1%	%5'0
Oxygen	05	4.7%	4.7%	5.4%
Nitrogen	N2	%6.09	%6'09	61.4%
Methane	СНА	1.8%	1.8%	1.0%
Carbon Monoxide	8	15.3%	15.3%	15.4%
Carbon Dioxide	C02	10.3%	10.3%	16.3%
Water	H20	%0.0	0.0%	%0'0
Acetylene	C2H2	%0.0	%0.0	%0.0
Ethylene	C2H4	%0.0	%0.0	%0.0
Ethane	С2Н6	%0.0	%0.0	%0.0

Molecular Weight - MW	27.78	
Resultant Gas Constant - R	55.64	Ft-lbf/lbm/R
Specific Gravity - SG	656'0	
Density at 70 F & 14.7 psia	0.0719	0.0719 lbm/ft ^{A3}
Ratio of Specific Heats - k	1.3797	Cp/Cv
Critical Pressure Ratio - CPR	0.5183	
High Heating Value - HHV	06	BTU/SCF
Low Heating Value - LHV	85	BTU/SCF
Stoichometric Air; Fuel Ratio	0.704	by Volume
Stoichometric Air:Fuel Ratio	0.618	by Mass
Low Flammability Limit in Air	2.3%	LFL.
High Flammability Limit in Air	16.9%	HFL
Auto Ignition Temperature	1.066	1.066 deg F

Technician Initials:	XL	
Report Date:	10/24/2013	





Sample No.:	SB102413-1030
Sample Date:	10/24/2013
Sample Description:	IIRPG, Campus Pine Chips, 102 BTU on Calorval
Analysis Date:	10/24/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	%1.9	6.7%	0.5%
Oxygen	02	4.4%	4.4%	2.0%
Nitrogen	N2	%6'09	%6'09	61.1%
Methane	CH4	1.8%	1.8%	1.0%
Carbon Monoxide	8	15.8%	15.8%	15.9%
Carbon Dioxide	C02	10.5%	10,5%	16.5%
Water	HZO	%0.0	%0.0	%0.0
Acetylene	C2H2	%0.0	%0.0	%0.0
Ethylene	C2H4	%0.0	%0.0	%0.0
Ethane	С2Н6	%0.0	%0.0	%0.0

1.0%	15.9%	16.5%	%0.0	%0.0	%0.0	%0.0	
1.8%	15.8%	10.5%	%0.0	%0.0	%0.0	%0.0	
1.8%	15.8%	10.5%	%0.0	%0.0	%0.0	%0.0	
CH4	8	C02	H20	C2H2	C2H4	C2H6	
							L

Molecular Weight - MW	27.91	
Resultant Gas Constant - R	55.37	Ft-lbf/lbm/R
Specific Gravity - SG	0.963	
Density at 70 F & 14.7 psia	0.0722	0.0722 lbm/ft^3
Ratio of Specific Heats - k	1,3794	Cp/Cv
Critical Pressure Ratio - CPR	0.5195	
High Heating Value - HHV	16	BTU/SCF
Low Heating Value - LHV	85	BTU/SCF
Stoichometric Air:Fuel Ratio	0.705	by Volume
Stoichometric Air:Fuel Ratio	0.624	by Mass
Low Flammability Limit in Air	2.3%	LFL
High Flammability Limit in Air	17.0%	HFI.
Auto Ignition Temperature	1.070	1.070 deg F

Technician Initials:	XII	
Report Date:	10/24/2013	





Sample No.:	SB101613-1329
Sample Date:	10/15/2013
Sample Description:	IIRPG, Dry Wood Chips, Good Flare
Analysis Date:	10/15/2013

Analysis by Gas Chromatograph

	Chemical	Analysis	Analysis	Analysis
Component	Formula	% Volume	% mole	% Mass
Hydrogen	H2	3.1%	3.1%	0.2%
Oxygen	05	5.2%	5.2%	%0'9
Nitrogen	N2	85.9%	85.9%	86.0%
Methane	CH4	0.0%	0.0%	%0.0
Carbon Monoxide	8	2.2%	2.2%	2.2%
Carbon Dioxide	C02	3.6%	3.6%	2.6%
Water	H20	%0.0	%0.0	%0.0
Acetylene	C2H2	%0.0	0.0%	%0.0
Ethylene	C2H4	%0.0	%0.0	%0.0
Ethane	C2H6	0.0%	%0.0	%0.0

70001 70001	7001 = 1

Molecular Weight - MW	27.99	
Resultant Gas Constant - R	55.21	Ft-lbf/lbm/R
Specific Gravity - SG	996'0	
Density at 70 F & 14.7 psia	0.0724	0.0724 lbm/ft^3
Ratio of Specific Heats - k	1.3933 Cp/Cv	Cp/Cv
Critical Pressure Ratio - CPR	0.5220	
High Heating Value - HHV	17	BTU/SCF
Low Heating Value - LHV	16	BTU/SCF
Stoichometric Air:Fuel Ratio	0.126	by Volume
Stoichometric Air:Fuel Ratio	0.080	by Mass
Low Flammability Limit in Air	0.4%	LFL
High Flammability Limit in Air	4.0%	HFL
Auto lenition Temperature	1 013	1 013 day E

Low Flammability Limit in Air	0.4%	LFI.
High Flammability Limit in Air	4.0%	托
Auto Ignition Temperature	1,013	1,013 deg F
Technician Initials:	XII	
Report Date:	10/15/2013	





Sample No.:	SB092513-1418
Sample Date:	9/25/2013
Sample Description:	IIRPG, Cafeteria Waste, 125 BTU on Calorval
Analysis Date:	9/25/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	2.9%	2.9%	0.4%
Oxygen	02	1.4%	1.4%	1.6%
Nitrogen	NZ	64.7%	64.7%	%9.69
Methane	СН4	1.6%	1.6%	0.9%
Carbon Monoxide	8	12.7%	12.7%	12.5%
Carbon Dioxide	C02	13.6%	13.6%	21.0%
Water	HZO	%0.0	%0.0	%0.0
Acetylene	CZHZ	%0.0	%0.0	0.0%
Ethylene	C2H4	%0.0	%0.0	0.0%
Ethane	С2Н6	%0.0	0.0%	%0.0

Molecular Weight - MW	28.52	
Resultant Gas Constant - R	54,19	Ft-lbf/lbm/R
Specific Gravity - SG	0.984	
Density at 70 F & 14.7 psia	0.0738	lbm/ft ^A 3
Ratio of Specific Heats - k	1,3742	Cp/Cv
Critical Pressure Ratio - CPR	0.5244	
High Heating Value - HHV	9/	BTU/SCF
Low Heating Value - LHV	72	BTU/SCF
Stoichometric Air:Fuel Ratio	0.595	by Volume
Stoichometric Air:Fuel Ratio	0.511	by Mass
Low Flammability Limit in Air	1.9%	IFI
High Flammability Limit in Air	14.1%	HFL
Auto Ignition Temperature	1,067 deg F	deg F

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ХТС	9/26/2
Technician Initials:	Report Date:

	0.400	0.466 lib per lb of combustible
7	0.143	0.143 ft^3 per ft^3 of combustible
0	0.091	0.091 ft^3 per ft^3 of combustible
	0.470	0.470 ft/13 oper ft/13 of combustible





Sample No.:	SB092513-1407
Sample Date:	9/25/2013
Sample Description:	IIRPG, Cafeteria Waste, 124 BTU on Calorval
Analysis Date:	9/25/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	4.7%	4.7%	0.3%
Oxygen	02	2.3%	2.3%	7.6%
Nitrogen	NZ	65.4%	65.4%	%9'89
Methane	CH4	1.7%	1.7%	1.0%
Carbon Monoxide	8	12.5%	12.5%	12.1%
Carbon Dioxide	C02	13.4%	13,4%	20.4%
Water	H20	%0.0	%0.0	%0.0
Acetylene	CZHZ	%0.0	%0.0	%0.0
Ethylene	C2H4	%0.0	%0.0	%0.0
Ethane	С2Н6	%0.0	%0.0	%0.0

Molecular Weight - MW	28.82	
Resultant Gas Constant - R	53.63	Ft-lbf/lbm/R
Specific Gravity - SG	0.995	
Density at 70 F & 14.7 psia	0.0746	0.0746 lbm/ft ^{A3}
Ratio of Specific Heats - k	1,3748	Cp/Cv
Critical Pressure Ratio - CPR	0.5272	
High Heating Value - HHV	73	BTU/SCF
Low Heating Value - LHV	69	BTU/SCF
Stoichometric Air: Fuel Ratio	0.572	by Volume
Stoichometric Air:Fuel Ratio	0.502	by Mass
Low Flammability Limit in Air	1.8%	IFI.
High Flammability Limit in Air	13.0%	HFL
Auto Ignition Temperature	1.074 deg F	deg F

ХТГ	9/26/2013
Technician Initials:	Report Date:

25	0.142	0.142 ft^3 per ft^3 of combustible
H20	0.081	0.081 ft^3 per ft^3 of combustible
2	0.452	0.452 ft^3 per ft^3 of combustible





Cameralia Nice .	
Sample No.:	SB092513-1403
Sample Date:	9/25/2013
Sample Description:	IIRPG, Cafeteria Waste, 110 BTU on Calorval
Analysis Date:	9/25/2013

Analysis by Gas Chromatograph

Component	Chemical Formula	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	4.7%	4.7%	0.3%
Oxygen	70	2.4%	2.4%	2.8%
Nitrogen	NZ	62.3%	62.3%	61.4%
Methane	CH4	1.2%	1.2%	0.7%
Carbon Monoxide	8	19.1%	19.1%	18.8%
Carbon Dioxide	C02	10.3%	10.3%	16.0%
Water	HZO	%0.0	%0.0	%0.0
Acetylene	CZHZ	%0.0	%0.0	%0.0
Ethylene	C2H4	%0.0	%0.0	%0.0
Ethane	CZH6	%0.0	0.0%	%0.0

0.202 ftv3 per ftv3 of combustible 0.070 ftv3 per ftv3 of combustible 0.535 ftv3 per ftv3 of combustible

Stoichiometric Combustion Products:
CO2 0.314 | lb per lb of combustible
H2O 0.045 | lb per lb of combustible
N2 0.533 | lb per lb of combustible

Molecular Weight - MW	28.39	
Resultant Gas Constant - R	54.44	Ft-lbf/lbm/R
Specific Gravity - SG	0.980	
Density at 70 F & 14.7 psia	0.0735	lbm/ft ^{A3}
Ratio of Specific Heats - k	1,3803	Cp/Cv
Critical Pressure Ratio - CPR	0.5241	
High Heating Value - HHV	68	BTU/SCF
Low Heating Value - LHV	82	BTU/SCF
Stoichometric Air: Fuel Ratio	0.678	by Volume
Stoichometric Air:Fuel Ratio	0.617	by Mass
Low Flammability Limit in Air	7.6%	IFI
High Flammability Limit in Air	17.9%	HFL
Auto Ignition Temperature	1,088 deg F	deg F

Technician Initials:	ХЦ	
Report Date:	9/26/2013	





Sample No.:	SB083013-1325
Sample Date:	8/30/2013
Sample Description:	Wood Pellets, IIRPG
Analysis Date:	8/30/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	8.6%	8.6%	%9.0
Oxygen	02	2.1%	2.1%	2.5%
Nitrogen	N2	55.2%	55.2%	27.8%
Methane	СН4	2.1%	2.1%	1.2%
Carbon Monoxide	8	25.0%	25.0%	26.2%
Carbon Dioxide	C02	7.1%	7.1%	11.7%
Water	HZO	%0.0	%0.0	%0.0
Acetylene	CZHZ	%0.0	%0.0	%0.0
Ethylene	C2H4	%0.0	%0.0	%0.0
Ethane	С2Н6	%0.0	%0.0	%0.0

Calculated Values:

Molecular Weight - MW	26.76	
Resultant Gas Constant - R	57.75	Ft-lbf/lbm/R
Specific Gravity - SG	0.924	
Density at 70 F & 14.7 psia	0.0693 Ibm/ft ^A 3	lbm/ft^3
Ratio of Specific Heats - k	1,3850 Cp/Cv	Cp/Cv
Critical Pressure Ratio - CPR	0.5094	
High Heating Value - HHV	129	BTU/SCF
Low Heating Value - LHV	123	BTU/SCF
Stoichometric Air:Fuel Ratio	0.997	by Volume
Stoichometric Air:Fuel Ratio	0.936	by Mass
Low Flammability Limit in Air	3.6%	IFI.
High Flammability Limit in Air	25.2%	HFL
Auto Ignition Temperature	1,078 deg F	deg F

χĽ	8/30/2013
Technician Initials:	Report Date:

Stoichiometric Combustion Products:
CO2 0.445 | Ibper Ib of combustible
H2O 0.086 | Ibper Ib of combustible
N2 0.833 | Ibper Ib of combustible

202	0.271	ftv3 pe	er ft^3 of c	3.271 ft^3 per ft^3 of combustible
Н20	0.127	ft^3 pe	ir ft^3 of c	0.127 ft^3 per ft^3 of combustible
NZ	0.788	ft ^{A3} De	ir ft^3 of c	0.788 ft ^{A3} per ft ^{A3} of combustible





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Sample No.:	SB083013-1318
Sample Date:	8/30/2013
Sample Description:	Wood Pellets, IIRPG
Analysis Date:	8/30/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	9.2%	9.2%	0.7%
Oxygen	02	1.2%	1.2%	1.5%
Nitrogen	N2	53.5%	53.5%	56.1%
Methane	CH4	2.3%	2.3%	1.4%
Carbon Monoxide	8	25.4%	25.4%	26.7%
Carbon Dioxide	C02	8.3%	8.3%	13.7%
Water	HZO	%0.0	%0.0	%0.0
Acetylene	C2H2	%0.0	%0.0	%0.0
Ethylene	C2H4	%0.0	%0.0	%0.0
Ethane	С2Н6	%0.0	0.0%	%0.0

Molecular Weight - MW	26.72	
Resultant Gas Constant - R	57.84	Ft-lbf/lbm/R
Specific Gravity - SG	0.922	
Density at 70 F & 14.7 psia	0.0692	lbm/ft ^{A3}
Ratio of Specific Heats - k	1,3826	Cp/Cv
Critical Pressure Ratio - CPR	0.5087	
High Heating Value - HHV	135	BTU/SCF
Low Heating Value - LHV	128	BTU/SCF
Stoichometric Air:Fuel Ratio	1.047	by Volume
Stoichometric Air:Fuel Ratio	086'0	by Mass
Low Flammability Limit in Air	3.7%	IFI
High Flammability Limit in Air	26.1%	HFL
Auto Prition Temperature	1.076 deg F	deg F

ХТ	8/30/2013
Technician Initials:	Report Date:

מימים ובל מיו במיוום מים ובמיום	0.876 Ib per Ib of combustible	0.278 ft^3 per ft^3 of combustible	0.139 ft^3 per ft^3 of combustible	fight on this of combustible
	0.876	0.278	0.139	0.877
2	2	02	20	2





Sample No.:	SB083013-1307
Sample Date:	8/30/2013
Sample Description:	Wood Pellets, IIRPG
Analysis Date:	8/30/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	7.9%	7.9%	%9.0
Oxygen	02	1.3%	1.3%	1.5%
Nitrogen	NZ	51.6%	51.6%	52.2%
Methane	СН4	2.7%	2.7%	1.6%
Carbon Monoxide	8	24.2%	24.2%	24.5%
Carbon Dioxide	C02	12.4%	12.4%	19.7%
Water	H20	%0.0	%0.0	%0.0
Acetylene	C2H2	%0.0	%0.0	%0.0
Ethylene	C2H4	%0.0	%0.0	0.0%
Ethane	С2Н6	%0.0	0.0%	%0.0

100%
100%
100%
Total =

Molecular Weight - MW	27.67	
Resultant Gas Constant - R	55.86	Ft-lbf/lbm/R
Specific Gravity - SG	0.955	
Density at 70 F & 14.7 psia	0.0716	0.0716 lbm/ft ^{A3}
Ratio of Specific Heats - k	1,3752 Cp/Cv	Cp/Cv
Critical Pressure Ratio - CPR	0.5167	
High Heating Value - HHV	131	BTU/SCF
Low Heating Value - LHV	124	BTU/SCF
Stoichometric Air:Fuel Ratio	1.020	by Volume
Stoichometric Air:Fuel Ratio	0.940	by Mass
Low Flammability Limit in Air	3.5%	IFI
High Flammability Limit in Air	24.2%	HFL
Auto Ignition Temperature	1.079 deg F	deg F

ХЛ	8/30/2013
Technician Initials:	Report Date:

CO2 0.428 Ibper lb of combust	0.428	0.428 b per b of combustible	
H20	0.086	0.086 Ib per Ib of combustible	
NZ	0.824	0.824 b per lb of combustible	

02	0.269	0.269 ft^3 per ft^3 of combustible
Н20	0.133	0.133 ft^3 per ft^3 of combustible
12	0.806	0.806 ft^3 per ft^3 of combustible





Sample No.:	SB083013-1301
Sample Date:	8/30/2013
Sample Description:	Wood Pellets, IIRPG
Analysis Date:	8/30/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	8.9%	%6.8	0.7%
Oxygen	02	1.3%	1.3%	1.5%
Nitrogen	NZ	52.7%	52.7%	23.6%
Methane	CH4	2.8%	2.8%	1.6%
Carbon Monoxide	8	21.0%	21.0%	21.3%
Carbon Dioxide	C02	13.3%	13.3%	21.3%
Water	H20	%0.0	%0.0	%0.0
Acetylene	C2H2	%0.0	%0.0	0.0%
Ethylene	C2H4	%0.0	%0.0	%0.0
Ethane	С2Н6	%0.0	0.0%	%0.0

Molecular Weight - MW	27.55	
Resultant Gas Constant - R	56.09	Ft-lbf/lbm/R
Specific Gravity - SG	0.951	
Density at 70 F & 14.7 psia	0.0713	lbm/ft ^{A3}
Ratio of Specific Heats - k	1,3732	Cp/Cv
Critical Pressure Ratio - CPR	0.5153	
High Heating Value - HHV	125	BTU/SCF
Low Heating Value - LHV	118	BTU/SCF
Stoichometric Air:Fuel Ratio	0.978	by Volume
Stoichometric Air:Fuel Ratio	0.883	by Mass
Low Flammability Limit in Air	3.1%	LFI.
High Flammability Limit in Air	22.6%	HFL
Auto Ignition Temperature	1,070 deg F	deg F

XII	8/30/2013
Technician Initials:	Report Date:

202	0.238	0.238 ft^3 per ft^3 of combustible
H20	0.145	0.145 ft^3 per ft^3 of combustible
V2	0.773	0.773 ft ^{A3} per ft ^{A3} of combustible





Sample No.:	SB082913-1328
Sample Date:	8/29/2013
Sample Description:	Wood Pellets, IIRPG
Analysis Date:	8/29/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	5.3%	5.3%	0.4%
Oxygen	02	1.3%	1.3%	1.5%
Nitrogen	NZ	62.7%	62.7%	62.7%
Methane	CH4	1.4%	1.4%	0.8%
Carbon Monoxide	8	20.1%	20.1%	20.1%
Carbon Dioxide	C02	9.3%	9.3%	14.6%
Water	H20	%0.0	0.0%	%0.0
Acetylene	CZHZ	%0.0	%0.0	%0.0
Ethylene	C2H4	%0.0	%0.0	%0.0
Ethane	С2Н6	%0.0	0.0%	%0.0

Calculated Values:

Molecular Weight - MW	28.02	
Resultant Gas Constant - R	55,16	Ft-lbf/lbm/R
Specific Gravity - SG	196'0	
Density at 70 F & 14.7 psia	0.0725	lbm/ft ^{A3}
Ratio of Specific Heats - k	1,3819	Cp/Cv
Critical Pressure Ratio - CPR	0.5208	
High Heating Value - HHV	96	BTU/SCF
Low Heating Value - LHV	92	BTU/SCF
Stoichometric Air:Fuel Ratio	0.736	by Volume
Stoichometric Air:Fuel Ratio	0.677	by Mass
Low Flammability Limit in Air	2.8%	IFI
High Flammability Limit in Air	19.1%	HFL
Auto Ignition Temperature	1,087 deg F	deg F

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0.215	ft^3 per ft^3 of combustible
0.080	ft^3 per ft^3 of combustible
0.581	ft^3 per ft^3 of combustible

CO2 H20 N2





Sample No.:	SB082913-1322
Sample Date:	8/29/2013
Sample Description:	Wood Pellets, IIRPG
Analysis Date:	8/29/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	7.7%	7.7%	%9.0
Oxygen	02	1.2%	1.2%	1.4%
Nitrogen	N2	57.1%	57.1%	29.0%
Methane	CH4	2.5%	2.5%	1.5%
Carbon Monoxide	8	22.9%	22.9%	23.7%
Carbon Dioxide	C02	8.6%	8.6%	13.9%
Water	H20	%0.0	%0.0	%0.0
Acetylene	C2H2	%0.0	%0.0	%0.0
Ethylene	C2H4	%0.0	%0.0	%0.0
Ethane	С2Н6	%0.0	%0.0	%0.0

100%
100%
100%
Total =

Molecular Weight - MW	27.13	
Resultant Gas Constant - R	26.96	Ft-lbf/lbm/R
Specific Gravity - SG	0.936	
Density at 70 F & 14.7 psia	0.0702 Ibm/ft ⁴³	lbm/ft ^A 3
Ratio of Specific Heats - k	1,3822	Cp/Cv
Critical Pressure Ratio - CPR	0.5125	
High Heating Value - HHV	124	BTU/SCF
Low Heating Value - LHV	118	BTU/SCF
Stoichometric Air:Fuel Ratio	0.967	by Volume
Stoichometric Air:Fuel Ratio	906'0	by Mass
Low Flammability Limit in Air	3.3%	LFI.
High Flammability Limit in Air	23.1%	HFL
Auto Ignition Temperature	1,079 deg F	deg F

ХТГ	8/29/2013
Fechnician Initials:	Report Date:

STOICHIC	metric C	Stoichiometric Compustion Products:
CO2	0.412	0.412 Ib per Ib of combustible
Н20	0.084	0.084 Ib per Ib of combustible
NZ	0.797	0.797 Ib per Ib of combustible

0.254	ffv3 p	er ft^3	ď	0.254 ft^3 per ft^3 of combustible
0.127	ftv3 p	er ft^3	6	ft^3 per ft^3 of combustible
0.764	ş	er ft ⁴³	jo	3 per ft^3 of combustible





Sample No.:	SB082913-1310
Sample Date:	8/29/2013
Sample Description:	Wood Pellets, IIRPG
Analysis Date:	8/29/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	8.0%	8.0%	%9.0
Oxygen	02	1.1%	1.1%	1.3%
Nitrogen	NZ	54.7%	54.7%	26.8%
Methane	CH4	1.9%	1.9%	1.2%
Carbon Monoxide	8	79.97	79.97	27.6%
Carbon Dioxide	C02	7.7%	7.7%	12.6%
Water	H20	%0.0	%0.0	%0.0
Acetylene	C2H2	%0.0	%0.0	%0.0
Ethylene	C2H4	%0.0	%0.0	%0.0
Ethane	С2Н6	%0.0	0.0%	%0.0

Molecular Weight - MW	26.98	
Resultant Gas Constant - R	57.27	Ft-lbf/lbm/R
Specific Gravity - SG	0.931	
Density at 70 F & 14.7 psia	8690'0	lbm/ft ^{A3}
Ratio of Specific Heats - k	1,3840	Cp/Cv
Critical Pressure Ratio - CPR	0.5114	
High Heating Value - HHV	131	BTU/SCF
Low Heating Value - LHV	125	BTU/SCF
Stoichometric Air:Fuel Ratio	1.009	by Volume
Stoichometric Air:Fuel Ratio	0:920	by Mass
Low Flammability Limit in Air	3.7%	IFI.
High Flammability Limit in Air	25.9%	HFL
Auto Ignition Temperature	1.082	1.082 deg F

Technician Initials:	ХЦ	
Report Date:	8/29/2013	

25	0.285	ft^3 per ft^3 of combustible
20	0.119	0.119 ft^3 per ft^3 of combustible
2	0.797	0.797 ft ^{A3} per ft ^{A3} of combustible





Sample No.:	SB082913-1304
Sample Date:	8/29/2013
Sample Description:	Wood Pellets, IIRPG
Analysis Date:	8/29/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	7.8%	7.8%	%9.0
Oxygen	05	1.1%	1.1%	1.3%
Nitrogen	N2	55.2%	55.2%	57.1%
Methane	CH4	1.8%	1.8%	1.0%
Carbon Monoxide	8	26.4%	26.4%	27.3%
Carbon Dioxide	C02	7.8%	7.8%	12.6%
Water	H20	%0.0	%0.0	%0.0
Acetylene	C2H2	%0.0	%0.0	%0.0
Ethylene	C2H4	%0.0	%0.0	%0.0
Ethane	С2Н6	%0.0	0.0%	%0.0

100% 100%
100%

Calculated Values:

Molecular Weight - MW	27.07	
Resultant Gas Constant - R	57.08	Ft-lbf/lbm/R
Specific Gravity - SG	0.935	
Density at 70 F & 14.7 psia	0.0701 lbm/ft ^A 3	lbm/ft^3
Ratio of Specific Heats - k	1,3840	Cp/Cv
Critical Pressure Ratio - CPR	0.5122	
High Heating Value - HHV	128	BTU/SCF
Low Heating Value - LHV	122	BTU/SCF
Stoichometric Air:Fuel Ratio	0.982	by Volume
Stoichometric Air:Fuel Ratio	0.922	by Mass
Low Flammability Limit in Air	3.7%	IFI.
High Flammability Limit in Air	25.6%	HFL
Auto Ignition Temperature	1,083 deg F	deg F

ХL	8/29/2013
Technician Initials:	Report Date:

T C C C C C C C C C C C C C C C C C C C
0.075 Ib per Ib of combustible
0.810 b per lb of combustible

CO2 0.282 fth3 per fth3 of combustible H2O 0.113 fth3 per fth3 of combustible N2 0.776 fth3 per fth3 of combustible

1	1	г
- 1	4	-





Sample No.:	SB082913-1258
Sample Date:	8/29/2013
Sample Description:	Wood Pellets, IIRPG
Analysis Date:	8/29/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	8.2%	8.2%	%9.0
Oxygen	02	1.0%	1.0%	1.2%
Nitrogen	N2	24.6%	54.6%	26.6%
Methane	CH4	2.0%	2.0%	1.2%
Carbon Monoxide	8	25.6%	25.6%	26.6%
Carbon Dioxide	C02	8.5%	8.5%	13.8%
Water	H20	%0.0	%0.0	%0.0
Acetylene	C2H2	%0.0	%0.0	%0.0
Ethylene	C2H4	%0.0	0.0%	%0.0
Ethane	С2Н6	%0.0	0.0%	%0.0

Molecular Weight - MW	27.02	
Resultant Gas Constant - R	57.19	Ft-lbf/lbm/R
Specific Gravity - SG	0.933	
Density at 70 F & 14.7 psia	0.0699	lbm/ft^3
Ratio of Specific Heats - k	1,3825 Cp/Cv	Cp/Cv
Critical Pressure Ratio - CPR	0.5116	
High Heating Value - HHV	130	BTU/SCF
Low Heating Value - LHV	124	BTU/SCF
Stoichometric Air:Fuel Ratio	1.001	by Volume
Stoichometric Air:Fuel Ratio	0.937	by Mass
Low Flammability Limit in Air	3.6%	191
High Flammability Limit in Air	25.5%	HEL
Auto Ignition Temperature	1,080 deg F	deg F

XII	8/29/2013
Technician Initials:	Report Date:

	0.451	0.451 Ib per Ib of combustible
ī	0.082	0.082 Ib per Ib of combustible

0.277	0.277 ft^3 per ft^3 of combustible
0.123	0.123 ft^3 per ft^3 of combustible
0.791	ft^3 per ft^3 of combustible





	111111111111111111111111111111111111111
Sample No.:	SB082913-1253
Sample Date:	8/29/2013
Sample Description:	Wood Pellets, IIRPG
Analysis Date:	8/29/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	8.3%	8.3%	%9.0
Oxygen	05	1.0%	1.0%	1.2%
Nitrogen	N2	54.0%	54.0%	25.6%
Methane	CH4	2.3%	2.3%	1.3%
Carbon Monoxide	03	24.6%	24.6%	25.3%
Carbon Dioxide	C02	%6.6	9.9%	15.9%
Water	H20	%0.0	%0.0	%0.0
Acetylene	CCHC	%0.0	%0.0	%0.0
Ethylene	C2H4	%0.0	0.0%	0.0%
Ethane	C2H6	%0.0	%0.0	%0.0

 CO2
 0.268
 ftv3 per ftv3 of combustible

 H2O
 0.128
 ftv3 per ftv3 of combustible

 NZ
 0.788
 ftv3 per ftv3 of combustible

0.434 |b per |b of combustible 0.085 |b per |b of combustible 0.819 |b per |b of combustible

Stoichiometric Combustion Products:

100% Total =

Contract of the contract of th		
Molecular Weight - MW	27.21	
Resultant Gas Constant - R	56.80	Ft-lbf/lbm/R
Specific Gravity - 5G	0.939	
Density at 70 F & 14.7 psia	0.0704	lbm/ft^3
Ratio of Specific Heats - k	1.3799	Cp/Cv
Critical Pressure Ratio - CPR	0.5130	
High Heating Value - HHV	129	BTU/SCF
Low Heating Value - LHV	122	BTU/SCF
Stoichometric Air:Fuel Ratio	866.0	by Volume
Stoichometric Air:Fuel Ratio	0.926	by Mass
Low Flammability Limit in Air	3.5%	LFL.
High Flammability Limit in Air	24.7%	HFL
Auto Ignition Temperature	1.078	1.078 dee F

JTX 8/29/2013 Technician Initials: Report Date:





Sample No.:	SB082913-1248
Sample Date:	8/29/2013
Sample Description:	Wood Pellets, IIRPG
Analysis Date:	8/29/2013

Analysis by Gas Chromatograph

tunnoumo	Chemical	Analysis %	Analysis %	Analysis %
Hydrogen	H2	8.4%	8.4%	%9.0
Oxygen	02	1.0%	1.0%	1.1%
Nitrogen	N2	53.1%	53.1%	54.2%
Methane	CH4	2.5%	2.5%	1.5%
Carbon Monoxide	8	23.1%	23.1%	23.6%
Carbon Dioxide	C02	11.8%	11.8%	19.0%
Water	H20	%0.0	%0.0	%0.0
Acetylene	C2H2	%0.0	%0.0	%0.0
Ethylene	С2Н4	%0.0	%0.0	%0.0
Ethane	С2Н6	%0.0	%0.0	%0.0

 CO2
 0.257
 ftv3 per ftv3 of combustible

 H2O
 0.134
 ftv3 per ftv3 of combustible

 NZ
 0.784
 ftv3 per ftv3 of combustible

Stoichiometric Combustion Products:
CO2 0.411 | Ib per lb of combustible
H2O 0.088 | Ib per lb of combustible
NZ 0.807 | Ib per lb of combustible

Total = 100% 100% 100%

Calculated Values:

Molecular Weight - MW	27.47	
Resultant Gas Constant - R	56.25	Ft-lbf/lbm/R
Specific Gravity - SG	0.948	
Density at 70 F & 14.7 psia	0.0711	lbm/ft ^{v3}
Ratio of Specific Heats - k	1.3761	Cp/Cv
Critical Pressure Ratio - CPR	0.5150	
High Heating Value - HHV	127	BTU/SCF
Low Heating Value - LHV	121	BTU/SCF
Stoichometric Air:Fuel Ratio	0.992	by Volume
Stoichometric Air:Fuel Ratio	0.910	by Mass
Low Flammability Limit in Air	3.4%	(FL
High Flammability Limit in Air	23.8%	HFL
Auto lenition Temperature	1.076 deg F	dee F

Technician initials: JTX Report Date: 8/29/2013





Sample No.:	SB082913-1243
Sample Date:	8/29/2013
Sample Description:	Wood Pellets, IIRPG
Analysis Date:	8/29/2013

Analysis by Gas Chromatograph

Component	Chemical Formula	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	8.8%	8.8%	0.7%
Oxygen	02	1.3%	1.3%	1.7%
Nitrogen	N2	%6.05	20.9%	29.6%
Methane	CH4	3.3%	3,3%	7.7%
Carbon Monoxide	03	21.3%	21.3%	25.0%
Carbon Dioxide	C02	%0.0	%0.0	%0.0
Water	HZO	14.3%	14.3%	10.8%
Acetylene	ССНС	%0.0	%0.0	%0.0
Ethylene	C2H4	%0.0	0.0%	%0.0
Ethane	С2Н6	%0.0	%0.0	%0.0

Stoichiometric Combustion Products:	0.453 Ib per Ib of combustible	0.116 lb per lb of combustible	0.965 Ib per Ib of combustible		ftn3 per ftn3 of combustible	0.154 ft^3 per ft^3 of combustible	0.818 ft^3 per ft^3 of combustible			
metric Co	0.453	0.116	0.965		0.247	0.154	0.818			
Stoichio	CO2	H20	N2		C02	H20	N2			
% Mass	0.7%	1.7%	89.6%	2.2%	25.0%	0.0%	10.8%	0.0%	%0.0	0.0%
% mole % Mass	8.8% 0.7%	1.3% 1.7%	89.68 89.6%	3.3% 2.2%	21.3% 25.0%	0.0% 0.0%	14.3% 10.8%	0.0% 0.0%	%0.0 %0.0	0.0% 0.0%

Total = 100% 100% 100%

Calculated Values:		
Molecular Weight - MW	23.95	
Resultant Gas Constant - R	64.53	Ft-lbf/lbm/R
Specific Gravity - SG	0.827	
Density at 70 F & 14.7 psia	0.0620	Ibm/ft^3
Ratio of Specific Heats - k	1.3907	Cp/Cv
Critical Pressure Ratio - CPR	0.4826	
High Heating Value - HHV	131	BTU/SCF
Low Heating Value - LHV	123	BTU/SCF
Stoichometric Air:Fuel Ratio	1.035	by Volume
Stoichometric Air:Fuel Ratio	1.087	by Mass
Low Flammability Limit in Air	3.2%	LFL
High Flammability Limit in Air	22.9%	HFL
Auto Ignition Temperature	1,071	1,071 deg F

echnician Initials:	XII
eport Date:	8/29/2013





Sample No.:	SB080113-1112
Sample Date:	8/1/2013
Sample Description:	IIRPG, Pine Shavings
Analysis Date:	8/1/2013

Analysis by Gas Chromatograph

Component	Chemical Formula	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	%6'9	%6.9	0.5%
Oxygen	02	2.4%	2.4%	2.8%
Nitrogen	N2	56.4%	56.4%	28.0%
Methane	CH4	1.7%	1.7%	1.0%
Carbon Monoxide	8	25.3%	25.3%	26.0%
Carbon Dioxide	CO2	7.3%	7.3%	11.7%
Water	HZO	%0.0	960'0	%0.0
Acetylene	C2H2	0.0%	%0.0	%0.0
Ethylene	C2H4	%0.0	%0.0	%0.0
Ethane	С2Н6	%0.0	%0.0	%0.0

0.270 ft^3 per ft^3 of combustible 0.103 ft^3 per ft^3 of combustible 0.733 ft^3 per ft^3 of combustible

Stoichiometric Combustion Products:
CO2 0.436 | Ib per lb of combustible
H2O 0.068 | Ib per lb of combustible
N2 0.760 | Ib per lb of combustible

Molecular Weight - MW	27.28	
Resultant Gas Constant - R	99.95	Ft-lbf/lbm/R
Specific Gravity - SG	0.942	
Density at 70 F & 14.7 psia	90.000	0.0706 lbm/ft ^{A3}
Ratio of Specific Heats - k	1.3852	cp/cv
Critical Pressure Ratio - CPR	0.5143	
High Heating Value - HHV	121	BTU/SCF
Low Heating Value - LHV	116	BTU/SCF
Stoichometric Air:Fuel Ratio	0.928	by Volume
Stoichometric Air:Fuel Ratio	0.872	by Mass
Low Flammability Limit in Air	3.5%	IFL
High Flammability Limit in Air	24.2%	HFL
Auto Ignition Temperature	1.085 dee F	dep F

echnician Initials:	XLI
eport Date:	8/1/2013





Sample No.:	SB080113-1050
Sample Date:	8/1/2013
Sample Description:	IIRPG, Pine Shavings
Analysis Date:	8/1/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	HZ	7.5%	7.5%	%9.0
Охувел	02	1.5%	1.5%	1.8%
Nitrogen	N2	54.5%	54.5%	26.3%
Methane	CH4	1.6%	1.6%	1.0%
Carbon Monoxide	03	27.4%	27.4%	28.2%
Carbon Dioxide	C02	7.5%	7.5%	12.1%
Water	H20	%0.0	%0.0	%0.0
Acetylene	C2H2	%0.0	%0.0	%0.0
Ethylene	C2H4	%0.0	%0.0	%0.0
Ethane	С2Н6	%0.0	%0.0	%0.0

0.290 ft^{A3} per ft^{A3} of combustible 0.107 ft^{A3} per ft^{A3} of combustible 0.778 ft^{A3} per ft^{A3} of combustible

Stoichiometric Combustion Products:
CO2 0.470 | lb per lb of combustible
H2O 0.071 | lb per lb of combustible
N2 0.810 | lb per lb of combustible

Total = 100% 100% 100%

Calculated Values:

Molecular Weight - MW	27.14	
Resultant Gas Constant - R	56.95	Ft-lbf/lbm/R
Specific Gravity - SG	0.937	
Density at 70 F & 14.7 psia	0.0702	lbm/ft^3
Ratio of Specific Heats - k	1,3848	cp/cv
Critical Pressure Ratio - CPR	0.5129	
High Heating Value - HHV	129	BTU/SCF
Low Heating Value - LHV	123	BTU/SCF
Stoichometric Air:Fuel Ratio	0.984	by Volume
Stoichometric Air:Fuel Ratio	0.927	by Mass
Low Flammability Limit in Air	3.8%	IFL
High Flammability Limit in Air	26.1%	HFL
Auto lenition Temperature	1.086 deg F	deg F

Technician Initials: JTX
Report Date: 8/1/2013





Sample No.:	SB071613-1115
Sample Date:	7/16/2013
Sample Description:	IIRPG, Pine Shavings
Analysis Date:	7/17/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	HZ	15.2%	15.2%	1.2%
Охувеп	05	%0.0	960.0	%0.0
Nitrogen	NZ	%9.09	%9'09	67.9%
Methane	CH4	2.8%	2.8%	1.8%
Carbon Monoxide	03	13.3%	13.3%	14.9%
Carbon Dioxide	C02	8.0%	8.0%	14.2%
Water	HZ0	%0.0	%0.0	%0.0
Acetylene	C2H2	%0.0	960.0	0.0%
Ethylene	C2H4	%0.0	%0.0	%0.0
Ethane	С2Н6	%0.0	%0.0	0.0%

0.161 ftv3 per ftv3 of combustible 0.208 ftv3 per ftv3 of combustible 0.749 ftv3 per ftv3 of combustible

CO2 H20

0.150 lb per lb of combustible 0.150 lb per lb of combustible 0.847 lb per lb of combustible

Stoichiometric Combustion Products:

Total = 100% 100% 100%

Colonated Volues.		
Molecular Weight - MW	25.01	
Resultant Gas Constant - R	61.79	Ft-lbf/lbm/R
Specific Gravity - SG	0.863	
Density at 70 F & 14.7 psia	0.0647	0.0647 Ibm/ft^3
Ratio of Specific Heats - k	1.3817	cp/cv
Critical Pressure Ratio - CPR	0.4920	
High Heating Value - HHV	121	BTU/SCF
Low Heating Value - LHV	110	BTU/SCF
Stoichometric Air:Fuel Ratio	0.948	by Volume
Stoichometric Air:Fuel Ratio	0.822	by Mass
Low Flammability Limit in Air	2.4%	LFL.
High Flammability Limit in Air	21.7%	HFL
Auto Ignition Temperature	1.028 deg F	deg F

Technician Initials: JTX Report Date: 7/17/2013





Sample No.:	SB071613-1025
Sample Date:	7/16/2013
Sample Description:	IIRPG, Pine Shavings
Analysis Date:	7/17/2013

Analysis by Gas Chromatograph

Component	Chemical Formula	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	11.0%	11.0%	%6.0
Охувеп	02	%0.0	%0.0	%0.0
Nitrogen	N2	72.0%	72.0%	78.1%
Methane	CH4	2.0%	2.0%	1.3%
Carbon Monoxide	8	9.4%	9.4%	10.2%
Carbon Dioxide	CO2	2.6%	2.6%	%9.6
Water	H20	%0.0	0.0%	%0.0
Acetylene	CZHZ	%0.0	%0.0	%0.0
Ethylene	C2H4	%0.0	%0.0	%0.0
Ethane	С2Н6	%0.0	%0.0	%0.0

0.114 fth3 per fth3 of combustible 0.150 fth3 per fth3 of combustible 0.535 fth3 per fth3 of combustible

Stoichiometric Combustion Products:
CO2 0.194 | Ib per lb of combustible
H2O 0.105 | Ib per lb of combustible
N2 0.586 | Ib per lb of combustible

Molecular Weight - MW	25.82	
Resultant Gas Constant - R	59.84	Ft-lbf/lbm/R
Specific Gravity - SG	0.891	
Density at 70 F & 14.7 psia	8990'0	lbm/ft ⁿ 3
Ratio of Specific Heats - k	1.3875	Cp/Cv
Critical Pressure Ratio - CPR	0.5007	
High Heating Value - HHV	98	BTU/SCF
Low Heating Value - LHV	79	BTU/SCF
Stoichometric Air:Fuel Ratio	779.0	by Volume
Stoichometric Air:Fuel Ratio	0.567	by Mass
Low Flammability Limit in Air	1.7%	LFL.
High Flammability Limit in Air	15.5%	HFL
Auto Ignition Temperature	1 007 deo F	deo E

1000		BTU/SCF	BTU/SCF	by Volume	by Mass	141	HFL	deg F		
1	0.5007	86	79	0.677	0.567	1.7%	15.5%	1,027 deg F	XII	7/17/2013
the state of the s	Critical Pressure Ratio - CPR	High Heating Value - HHV	Low Heating Value - LHV	Stoichometric Air: Fuel Ratio	Stoichometric Air:Fuel Ratio	Low Flammability Limit in Air	High Flammability Limit in Air	Auto Ignition Temperature	Technician Initials:	Report Date:





	The second secon
Sample No.:	SB062013-1336
Sample Date:	6/20/2013
Sample Description:	IIRPG, Pine Shavings
Analysis Date:	6/20/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	3.2%	3.2%	0.5%
Oxygen	02	3.6%	3.6%	3.9%
Nitrogen	NZ	%0'59	65.0%	61.5%
Methane	CH4	1.9%	1.9%	1.0%
Carbon Monoxide	8	10.6%	10.6%	10.0%
Carbon Dioxide	C02	15.7%	15.7%	23.3%
Water	H20	%0.0	%0.0	%0.0
Acetylene	CZHZ	%0.0	%0.0	0.0%
Ethylene	C2H4	%0.0	%0.0	%0.0
Ethane	С2Н6	%0.0	%0.0	0.0%

Ft-lbf/lbm/R BTU/SCF 0.5340 64 60 0.512 0.453 52.18 29.62 High Flammability Limit in Air Low Flammability Limit in Air Low Heating Value - LHV Stoichometric Air:Fuel Ratio Critical Pressure Ratio - CPR Stoichometric Air:Fuel Ratio Molecular Weight - MW Resultant Gas Constant - R Specific Gravity - SG Density at 70 F & 14.7 psia **Auto Ignition Temperature** Ratio of Specific Heats - k High Heating Value - HHV Calculated Values:

XTL	6/20/2013
echnician Initials	port Date:

Stoichiometric Combustion Products:

CO2 0.186 | bper | b of combustible |
H2O 0.043 | bper | b of combustible |
N2 0.386 | lb per | b of combustible |
CO2 0.125 | ft^43 per ft^43 of combustible |
H2O 0.070 | ft^43 per ft^43 of combustible |
N2 0.404 | ft^43 per ft^43 of combustible |
N2 0.404 | ft^43 per ft^43 of combustible |





Sample No.:	\$8062013-1130
Sample Date:	6/20/2013
Sample Description:	IIRPG, Pine Shavings
Analysis Date:	6/20/2013

Analysis by Gas Chromatograph

Component	Chemical Formula	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	7.2%	7.2%	0.5%
Oxygen	02	2.9%	2.9%	3.3%
Nitrogen	NZ	23.0%	53.0%	52.0%
Methane	CH4	3.4%	3.4%	1.9%
Carbon Monoxide	00	16.7%	16.7%	16.4%
Carbon Dioxide	C02	16.8%	16.8%	26.0%
Water	H20	%0.0	%0.0	%0.0
Acetylene	C2H2	%0.0	%0.0	%0.0
Ethylene	C2H4	%0.0	%0.0	%0.0
Ethane	С2Н6	%0.0	%0.0	%0.0

0.201 ft^3 per ft^3 of combustible 0.140 ft^3 per ft^3 of combustible 0.704 ft^3 per ft^3 of combustible

CO2 H2O N2

Stoichiometric Combustion Products:
CO2 0.309 | Ibper lb of combustible
H2O 0.088 | Ibper lb of combustible
NZ 0.698 | Ibper lb of combustible

Total = 100% 100% 100%

Calculated Values.		
Molecular Weight - MW	28.54	
Resultant Gas Constant - R	54.14	Ft-lbf/lbm/R
Specific Gravity - SG	0.985	
Density at 70 F & 14.7 psia	0.0739	lbm/ft ⁴³
Ratio of Specific Heats - k	1.3674 Cp/Cv	Cp/Cv
Critical Pressure Ratio - CPR	0.5238	
High Heating Value - HHV	111	BTU/SCF
Low Heating Value - LHV	104	BTU/SCF
Stoichometric Air:Fuel Ratio	168'0	by Volume
Stoichometric Air:Fuel Ratio	0.791	by Mass
Low Flammability Limit in Air	2.5%	UFL
High Flammability Limit in Air	18.3%	HFL
Auto Ignition Temperature	1,070	1,070 deg F

Technician Initials: JTX
Report Date: 6/20/2013





Sample No.:	SB062013-1115
Sample Date:	6/20/2013
Sample Description:	IIRPG, Pine Shavings
Analysis Date:	6/20/2013

Analysis by Gas Chromatograph

Companent	Chemical Formula	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	7.4%	7.4%	0.5%
Oxygen	02	2.8%	2.8%	3.1%
Nitrogen	N2	54.6%	54.6%	23.9%
Methane	CH4	3.5%	3.5%	2.0%
Carbon Monoxide	8	15.6%	15.6%	15.4%
Carbon Dioxide	C02	16.2%	16.2%	25.1%
Water	HZO	%0.0	%0.0	%0.0
Acetylene	C2H2	%0.0	%0.0	0.0%
Ethylene	C2H4	%0.0	%0.0	%0'0
Ethane	С2Н6	%0.0	%0.0	%0.0

Total = 100% 100% 100%

Molecular Weight - MW	28.38	
Resultant Gas Constant - R	54.46	Ft-lbf/lbm/R
Specific Gravity - SG	0.980	
Density at 70 F & 14.7 psia	0.0735	0.0735 lbm/ft ¹ 3
Ratio of Specific Heats - k	1.3684	Cp/Cv
Critical Pressure Ratio - CPR	0.5224	
High Heating Value - HHV	109	BTU/SCF
Low Heating Value - LHV	102	BTU/SCF
Stoichometric Air:Fuel Ratio	6.879	by Volume
Stoichometric Air:Fuel Ratio	082'0	by Mass
Low Flammability Limit in Air	2.4%	IFL
High Flammability Limit in Air	17.6%	HFL
Auto Ignition Temperature	1.067	1 067 deg E

JTX 6/20/2013

Technician Initials: Report Date:

Stoichiometric Combustion Products:

CO2 0,296 lb per lb of combustible
H2O 0.091 lb per lb of combustible
N2 0.692 lb per lb of combustible
CO2 0.191 ftv3 per ftv3 of combustible
H2O 0.143 ftv3 per ftv3 of combustible
N2 0.694 ftv3 per ftv3 of combustible



Cobleskill



Synthetic Gas Analysis Report

Sample No.:	SB062013-1101
Sample Date:	6/20/2013
Sample Description:	IIRPG, Pine Shavings
Analysis Date:	6/20/2013

Analysis by Gas Chromatograph

Component	Chemical Formula	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	8.5%	8.5%	%9'0
Oxygen	02	2.2%	2.2%	7.5%
Nitrogen	N2	54.1%	54.1%	54.2%
Methane	CH4	2.7%	2.7%	1.5%
Carbon Monoxide	00	17.6%	17.6%	17.6%
Carbon Dioxide	C02	15.0%	15.0%	23.5%
Water	H20	%0.0	%0.0	%0.0
Acetylene	C2H2	%0.0	%0.0	%0.0
Ethylene	C2H4	%0.0	%0.0	%0.0
Ethane	C2H6	%0.0	%0.0	0.0%

0.203 ft^{x3} per ft^{x3} of combustible 0.138 ft^{x3} per ft^{x3} of combustible 0.692 ft^{x3} per ft^{x3} of combustible

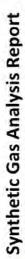
CO2 0.319 lb per lb of combustible H2O 0.089 lb per lb of combustible N2 0.700 lb per lb of combustible Stoichiometric Combustion Products:

%0:0	100%
0.0%	100%
0.0%	100%
С2Н6	Total =

Molecular Weight - MW	27.98	
Resultant Gas Constant - R	55.24	Ft-lbf/lbm/R
Specific Gravity - SG	996'0	
Density at 70 F & 14.7 psia	0.0724	0.0724 lbm/ft^3
Ratio of Specific Heats - k	1.3706	Cp/Cv
Critical Pressure Ratio - CPR	0.5189	
High Heating Value - HHV	111	BTU/SCF
Low Heating Value - LHV	104	BTU/SCF
Stoichometric Air:Fuel Ratio	0.876	by Volume
Stoichometric Air:Fuel Ratio	0.771	by Mass
Low Flammability Limit in Air	2.7%	LET.
High Flammability Limit in Air	19.8%	HFL
Auto Ignition Temperature	1.065	1,065 deg F

Nesditalit das Collstalit - N	23.54	23.54 rtabilibility
Specific Gravity - SG	0.966	
Density at 70 F & 14.7 psia	0.0724	0.0724 lbm/ft^3
Ratio of Specific Heats - k	1,3706 Cp/Cv	Cp/Cv
Critical Pressure Ratio - CPR	0.5189	
High Heating Value - HHV	111	BTU/SCF
Low Heating Value - LHV	104	BTU/SCF
Stoichometric Air:Fuel Ratio	0.876	by Volume
Stoichometric Air:Fuel Ratio	0.771	by Mass
Low Flammability Limit in Air	2.7%	IFI.
High Flammability Limit in Air	19.8%	HFL
Auto Ignition Temperature	1,065	1,065 deg F





Sample No.:	SB062013-1052
Sample Date:	6/20/2013
Sample Desription:	IIRPG, Pine Shavings
Analysis Date:	6/20/2013

Analysis by Gas Chromatograph

Component	Chemical Formula	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	HZ	9.2%	9.2%	0.7%
Oxygen	02	2.0%	2.0%	2.3%
Nitrogen	N2	25.8%	55.8%	26.5%
Methane	CHA	2.1%	2.1%	1.2%
Carbon Monoxide	8	17.4%	17.4%	17.6%
Carbon Dioxide	C02	13.6%	13.6%	21.6%
Water	H20	%0.0	0.0%	%0.0
Acetylene	C2H2	%0.0	%0.0	0.0%
Ethylene	C2H4	%0.0	0.0%	0.0%
Ethane	С2Н6	%0.0	0.0%	0.0%

Stolen Stolen College Stole Control	0.311 lb per lb of combustible	0.087 Ib per Ib of combustible	0.673 Ib per Ib of combustible	0.195 ft^3 per ft^3 of combustible	0.133 ft^3 per ft^3 of combustible	O CEO GAN mar GAN of commerceible
OHE BILL	0.311	0.087	0.673	0.195	0.133	0230
	C02	HZO	NZ	200	Н20	CIN

100%	= letc
	100%

Manior Mainh Mainh	27 63	
Molecular Weight - MW	50.12	
Resultant Gas Constant - R	55.92	Ft-lbf/lbm/R
Specific Gravity - SG	0.954	
Density at 70 F & 14.7 psia	0.0715	lbm/ft^3
Ratio of Specific Heats - k	1.3731	cp/cv
Critical Pressure Ratio - CPR	0.5161	
High Heating Value - HHV	107	BTU/SCF
Low Heating Value - LHV	100	BTU/SCF
Stoichometric Air:Fuel Ratio	0.832	by Volume
Stoichometric Air:Fuel Ratio	0.723	by Mass
Low Flammability Limit in Air	2.6%	IFL
High Flammability Limit in Air	20.1%	HFL
Auto Ignition Temperature	1.062	1,062 deg F

chnician Initials:	XII
enort Date:	6/20/2013





Sample No.:	SB060713-1251
Sample Date:	6/7/2013
Sample Description:	IIRPG, Pine Shavings
Analysis Date:	6/7/2013

Analysis by Gas Chromatograph

Component	Chemical Formula	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	4.8%	4.8%	0.3%
Oxygen	02	%6.0	%6'0	1.0%
Nitrogen	N2	62.5%	62.5%	61.2%
Methane	CH4	1.7%	1.7%	%6.0
Carbon Monoxide	8	17.8%	17.8%	17.5%
Carbon Dioxide	C02	12.3%	12,3%	19.0%
Water	H20	%0.0	%0.0	%0.0
Acetylene	CZHZ	%0.0	%0.0	%0.0
Ethylene	C2H4	%0.0	%0.0	%0.0
Ethane	C2H6	%0.0	%0.0	%0.0

Total = 100% 100% 100%

Calculated Values:

Molecular Weight - MW	28.57	
Resultant Gas Constant - R	54.10	54.10 Ft-lbf/lbm/R
Specific Gravity - SG	986'0	
Density at 70 F & 14.7 psia	0.0739	0.0739 Ibm/ft^3
Ratio of Specific Heats - k	1.3765 Cp/Cv	Cp/Cv
Critical Pressure Ratio - CPR	0.5252	
High Heating Value - HHV	06	BTU/SCF
Low Heating Value - LHV	98	BTU/SCF
Stoichometric Air:Fuel Ratio	669'0	by Volume
Stoichometric Air:Fuel Ratio	0.634	by Mass
Low Flammability Limit in Air	2.5%	LFI.
High Flammability Limit in Air	17.0% HFL	HFL
Auto Ignition Temperature	1.086 deg F	deg F

Technician Initials: JTX
Report Date: 6/7/2013

toichiometric Combustion Products	0.300 lb per lb of combustible	0.052 Ib per lb of combustible	0.547 Ib ner lb of combustible
toich	202	420	N2

7	0.195	ft^3 per ft^3 of combustible
0	0.082	ft^3 per ft^3 of combustible
	0.552	ft^3 per ft^3 of combustible





Sample No.:	SB060713-1245
Sample Date:	6/7/2013
Sample Description:	IIRPG, Pine Shavings
Analysis Date:	6/7/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	6.1%	6.1%	0.4%
Oxygen	07	%6'0	%6.0	1.0%
Nitrogen	N2	61.5%	61.5%	61.0%
Methane	CH4	1.8%	1.8%	1.0%
Carbon Monoxide	03	16.4%	16.4%	16.2%
Carbon Dioxide	C02	13.1%	13.1%	20.3%
Water	H20	%0.0	%0.0	%0.0
Acetylene	C2H2	%0.0	%0.0	%0'0
Ethylene	С2Н4	%0.0	%0.0	%0.0
Ethane	С2Н6	%0.0	%0.0	%0.0

0.182 ftv3 per ftv3 of combustible 0.097 ftv3 per ftv3 of combustible 0.561 ftv3 per ftv3 of combustible

Stoichiometric Combustion Products:
CO2 0.283 lb per lb of combustible
H2O 0.062 lb per lb of combustible
N2 0.561 lb per lb of combustible

100% 100% 100%
Total =

Molecular Weight - MW	28.28	
Resultant Gas Constant - R	54.64	Ft-lbf/lbm/R
Specific Gravity - SG	976.0	
Density at 70 F & 14.7 psia	0.0732	0.0732 lbm/ft^3
Ratio of Specific Heats - k	1.3748 Cp/Cv	Cp/Cv
Critical Pressure Ratio - CPR	0.5223	
High Heating Value - HHV	91	BTU/SCF
Low Heating Value - LHV	98	BTU/SCF
Stoichometric Air:Fuel Ratio	0.710	by Volume
Stoichometric Air:Fuel Ratio	0.631	by Mass
Low Flammability Limit in Air	2.4%	IEL.
High Flammability Limit in Air	16.9%	HFL
Auto Ignition Temperature	1.075 deg F	dez F

Technician Initials:	ХТГ	
Report Date:	6/7/2013	





Sample No.:	SB060713-1132
Sample Date:	6/7/2013
Sample Description:	IIRPG, Pine Shavings
Analysis Date:	6/7/2013

Analysis by Gas Chromatograph

Component	Chemical	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	2.8%	5.8%	0.4%
Oxygen	02	%6'0	%6'0	1.0%
Nitrogen	N2	61.0%	61.0%	%9.65
Methane	CH4	2.3%	2.3%	1.3%
Carbon Monoxide	00	15.0%	15.0%	14.7%
Carbon Dioxide	C02	15.0%	15.0%	23.0%
Water	H20	%0.0	%0.0	%0.0
Acetylene	C2H2	%0.0	%0'0	%0.0
Ethylene	C2H4	%0.0	%0.0	%0.0
Ethane	C2H6	%0.0	%0.0	%0.0

100% Total =

0.174 ftv3 per ftv3 of combustible 0.105 ftv3 per ftv3 of combustible 0.569 ftv3 per ftv3 of combustible

0.267 lb per lb of combustible 0.066 lb per lb of combustible 0.562 lb per lb of combustible

Stoichiometric Combustion Products:

Calculated Values:

Molecular Weight - MW	28.65	
Resultant Gas Constant - R	53.95	53.95 Ft-lbf/lbm/R
Specific Gravity - SG	686'0	
Density at 70 F & 14.7 psia	0.0741	0.0741 lbm/ft ⁿ³
Ratio of Specific Heats - k	1.3714 Cp/Cv	Cp/Cv
Critical Pressure Ratio - CPR	0.5252	
High Heating Value - HHV	91	BTU/SCF
Low Heating Value - LHV	98	BTU/SCF
Stoichometric Air:Fuel Ratio	0.720	by Volume
Stoichometric Air: Fuel Ratio	0.637	by Mass
Low Flammability Limit in Air	2.2%	IFI.
High Flammability Limit in Air	15.8%	HFL
Auto Ignition Temperature	1,074	1,074 deg F

JTX 6/7/2013 Technician Initials: Report Date:





Sample No.:	SB060713-1048
Sample Date:	6/7/2013
Sample Description:	IIRPG, Pine Shavings
Analysis Date:	6/7/2013

Analysis by Gas Chromatograph

Component	Chemical Formula	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	6.1%	6.1%	0.4%
Oxygen	05	%6.0	%6.0	1.1%
Nitrogen	NZ	60.3%	60.3%	58.9%
Methane	CH4	2.5%	2.5%	1.4%
Carbon Monoxide	00	14.2%	14.2%	13.8%
Carbon Dioxide	C02	15.9%	15.9%	24.4%
Water	H20	%0.0	%0.0	%0.0
Acetylene	C2H2	%0.0	%0'0	%0.0
Ethylene	C2H4	%0.0	0.0%	0.0%
Ethane	С2Н6	%0.0	%0.0	%0.0

600	0 356	On and the sample of comparatible
7	0.230	0.250 Ito per to of compustible
420	0.070	0.070 Ib per Ib of combustible
	0.564	0.564 lb per lb of combustible
C02	0.167	0.167 ft^3 per ft^3 of combustible
H20	0.112	0.112 ft^3 per ft^3 of combustible
N2	0.572	0.572 ft ^{A3} ner ft ^{A3} of combustible

Molecular Weight - MW	28.70	
Resultant Gas Constant - R	53.84	53.84 Ft-lbf/lbm/R
Specific Gravity - 5G	0.991	
Density at 70 F & 14.7 psia	0.0743	0.0743 lbm/ft^3
Ratio of Specific Heats - k	1,3696 Cp/Cv	Cp/Cv
Critical Pressure Ratio - CPR	0.5255	
High Heating Value - HHV	16	BTU/SCF
Low Heating Value - LHV	98	BTU/SCF
Stoichometric Air:Fuel Ratio	0.724	0.724 by Volume
Stoichometric Air:Fuel Ratio	0.635	0.635 by Mass
Low Flammability Limit in Air	2.1%	IFI.
High Flammability Limit in Air	15.5% HFL	HFL
Auto Ignition Temperature	1.070 deg F	deg F

Technician Initials:	XTL	
Report Date:	6/7/2013	





Sample No.:	SB060713-1011
Sample Date:	6/7/2013
Sample Description:	IIRPG, Pine Shavings
Analysis Date:	6/7/2013

Analysis by Gas Chromatograph

Component	Chemical Formula	Analysis % Volume	Analysis % mole	Analysis % Mass
Hydrogen	H2	3.7%	3.7%	0.3%
Oxygen	02	1.3%	1.3%	1.4%
Nitrogen	NZ	%6'99	%6.99	64.5%
Methane	CH4	1.1%	1.1%	%9'0
Carbon Monoxide	8	14.3%	14.3%	13.8%
Carbon Dioxide	C02	12.8%	12.8%	19.4%
Water	HZO	%0.0	%0.0	%0:0
Acetylene	C2H2	%0.0	%0.0	%0.0
Ethylene	C2H4	%0.0	%0'0	%0.0
Ethane	C2H6	%0.0	%0.0	%0.0

200	0.233	0.233 Ib per lb of combustible
H20	0.036	0.036 lb per lb of combustible
N2	0.407	0.407 Ib per Ib of combustible
200	0.154	0.154 ft^3 per ft^3 of combustible
HZO	0.058	0.058 ft^3 per ft^3 of combustible
NZ	0.418	0.418 ft ^{A3} per ft ^{A3} of combustible

Molecular Weight - MW	29.04	
Resultant Gas Constant - R	53,22	Ft-lbf/lbm/R
Specific Gravity - SG	1,002	
Density at 70 F & 14.7 psia	0.0752	lbm/ft^3
Ratio of Specific Heats - k	1.3763	cp/cv
Critical Pressure Ratio - CPR	0,5295	
High Heating Value - HHV	69	BTU/SCF
Low Heating Value - LHV	99	BTU/SCF
Stoichometric Air:Fuel Ratio	0.529	by Volume
Stoichometric Air:Fuel Ratio	0.471	by Mass
Low Flammability Limit in Air	2.0%	IFI.
High Flammability Limit in Air	13.5%	HFL
Auto Ignition Temperature	1.087 deg F	dep F

Technician Initials:	XTI	
Report Date:	6/7/2013	

Appendix C: Engine Based Electrical Generating Systems, Diesel vs. Spark Engines

(Note that this section was submitted previously in response to a specific question at the October 2013 IPR)

Various methods exist to generate electricity from a gasification system operating on waste. Internal combustion (I/C) engines (spark ignition and diesel) are the simplest methods to convert gaseous fuel into mechanical work to drive a generator. Other methods include steam turbines, reciprocating steam engines, organic Rankine, Brayton gas turbines, and Stirling external combustion engines. Simplicity, power density, safety, emissions, and cost are the major considerations that make I/C engines the most attractive.

The primary problem with operating an I/C engine-driven generator on syngas is crankshaft speed control as the electrical load and syngas energy values vary. The intent of this document is to describe the differences between diesel and spark ignition engine-driven generators fueled by ultra-low energy waste derived syngas.

Diesel engine-driven generators offer significant advantages for military applications. Diesel generators operate smoothly with acceptable frequency and voltage regulation as the syngas energy value and electrical load varies. The main advantage of diesel engines is that they do not use intake air throttle control to regulate engine speed. Engine speed is controlled by a governor that meters the amount of liquid fuel injected into each cylinder. Significant amounts of excess oxygen exist in the exhaust stream and the engine is not sensitive to lean air to fuel ratios. The engine operates seamlessly with drastic variations in syngas energy levels with no adjustment of combustion air.

The greatest disadvantage of diesel driven generators is liquid fuel usage. The engine must use some liquid diesel fuel to initiate compression ignition of the gaseous fuel mixture and for crankshaft speed control.

Otto spark ignition internal combustion engines can operate on 100% gaseous fuel and do not require dual fueling to operate. This offers a significant advantage over a diesel since the engine can operate solely on waste derived gaseous fuel, eliminating the need for ongoing use of expensive fossil fuels. The avoidance of co-fueling with fossil fuels can economically justify applying this technology for use at municipalities within the United States.

The main disadvantage of spark ignition engines is the intake air flow must be throttled to control engine speed. Maintaining the proper fueling rate and air to fuel ratio is essential with dramatic airflow changes. The air to fuel ratio must be maintained slightly richer than stoichiometric combustion. Proper control of engine speed and air to fuel ratio is nearly impossible to regulate as the electrical load and syngas energy content vary simultaneously.

Numerous concepts have been researched and developed by other entities to address this problem with spark ignition engines. These concepts use multiple regulators and electronically actuated flow control valves that must respond with precision accuracy to ensure the engine is adequately fueled to maintain synchronous speed and mechanical power at the critical air to fuel ratio.

Adequate metering of air and fuel gas must occur at varying flows as the throttle adjusts to maintain crankshaft speed. Most engines that are designed to operate on gaseous fuel require extensive controls when the energy value is 40% to 60% of natural gas. Waste derived syngas has an energy content that is 10% to 15% of natural gas, making reliable fueling for electrical power generation difficult or nearly impossible.

Another problem with ultra-low energy syngas is low air to fuel ratios, which are around 1:1 by volume. The flow of combustion air is offset by gaseous fuel. Low energy fuel requires a high flow rate to meet the power demands of the engine. The engine can actually become starved for adequate combustion air under heavy load conditions, causing lugging or even a crash stop.

C.1 Diesel Engines for Military Applications

The military has expelled significant effort to standardize on one fuel for all battlefield applications. JP-8 is a multipurpose fuel blend that is able to power both diesel and jet engines. This allows the military to deliver only one fuel to meet the energy needs of contingency bases (CB). Diesel engine-driven generators fueled by JP-8 are almost exclusively used to generate electricity on FOBs.

The project team decided to pursue the use of diesel generators for this WTE application. The single battlefield fuel policy is an important factor, but diesel gensets offer greater flexibility than spark engines in that they can effectively generate power under multiple scenarios (Table C-1). A standard spark engine can only effectively generate power when the syngas fed to it is of good, consistent quality (a new operating concept is presented in Section C.8).

Operating Condition Of WTE System	Diesel Genset Operation (Dual-Fuel With JP8)	Spark Genset Operation
used only as a generator, with no waste processing	Yes	no
bootstrap WTE system	Yes	no
highly variable waste feed, syngas quality	Yes	no
steady state WTE operations	Yes	yes

Table C-1. Diesel vs. Spark Operating Conditions.

C.2 Waste Derived Syngas

Military applications require simplicity and reliability. The WTE system developed by SUNY Cobleskill uses a robust and simple approach to thermally convert wastes into a gaseous fuel. Unfortunately, mixed wastes have two problems; excessive moisture and low energy content. Gasifying low energy wastes with excessive moisture results in ultra-low energy synthetic gas (syngas). The energy content of this gas is 10% to 15% of natural gas.

Nitrogen dilution is the main reason why the energy value of the syngas is weak. Waste derived syngas can be over 50% nitrogen. The majority of nitrogen is from air entering the gasifier to provide oxygen to combust char (flaming pyrolysis). The energy content of the syngas can easily be doubled by using pure oxygen, instead of air, for char combustion. However, the project team

believes that the use of oxygen is out of the question for contingency operations. Therefore the focus of research has been the most effective use possible of an internal combustion engine operating on ultra-low energy, unenhanced syngas.

C.3 Energy Level of Waste Derived Syngas

The LHV of the syngas must be considered when determining fueling requirements for engines. HHV is not used since water vapor is not condensed in the exhaust stream. The LHV of waste derived syngas varies between 90 and 180 BTU per standard cubic foot (BTU/SCF). The energy varies based on the feedstock. Low energy dripping wet feedstock results in low energy syngas. The intent is to homogenize feedstock to obtain an average energy content (HHV) of about 7500 BTU/lb. Depending on the FC content, this feedstock would generate a syngas with a LHV of 120 to 160 BTU/SCF.

Syngas with an energy content of 90 to 100 BTU/SCF is quasi flammable. Significant flame separation occurs as the energy value decreases. The flame blows itself out when the autoignition temperature cannot be maintained. A dual fueled engine can still operate with fossil fuel savings even if the syngas cannot sustain combustion in air.

C.4 Dual Fueling of Diesel Engine-Driven Generators

Diesel engines require very minor modifications to the air system to operate dual fueled on syngas and liquid diesel fuel. The only modification necessary is piping to introduce gaseous fuel into the airstream entering the engine. Figure C-1 shows the simplest configuration to feed syngas fuel into a diesel engine.

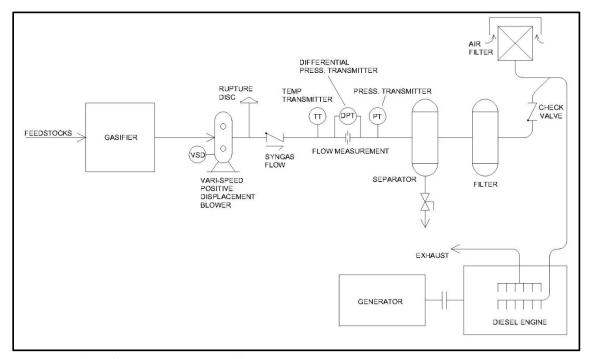


Figure C-1. Syngas Fuel Feed System into a Naturally Aspirated Diesel Engine.

A variable speed positive displacement blower is used to meter the feed of syngas to the engine at slightly positive pressure. The blower aspirates the gasifier system and engine vacuum is not used to avoid the significant loss of engine power. A flow orifice measures the flow of syngas. Gaseous fuel is fed into the intake air stream and enters the engine. The engine normally operates with significant amounts of excess oxygen in the exhaust stream, allowing any gaseous fuel to immediately combust.

The engine speed immediately increases when adding gaseous fuel. The engine governor monitors crankshaft speed and decreases the liquid fuel injection rate to maintain synchronous speed. The result is an immediate reduction in liquid fuel consumption. The flow of syngas can be further increased to offset liquid fuel usage. Limitations are insufficient excess air in the exhaust stream and pre-detonation (pre-ignition or excessive pinging) due to excessive gaseous fuel content exploding too quickly.

The flow of syngas is controlled at any load based on engine speed. Increasing the flow of syngas increases the engine speed on mechanically governed engines. The desired engine speed is the maximum governor speed at the fully unloaded condition. In most cases, this is 1860 rpm for a 4-pole generator. The flow of syngas is increased until the engine operates at the maximum allowable speed that results in the maximum liquid fuel savings. The engine can operate at any load using this method. Operating a diesel engine with the maximum syngas feed rate at full rated load results in 80% liquid fuel savings.

Increasing the syngas flow above the maximum allowable will cause the governor to momentarily stop the flow of liquid fuel into the engine. The engine speed drops and the governor starts the flow of injection again. This results in a surging of engine speed and is an indication of over-fueling the engine with syngas. Reducing the flow of syngas immediately corrects surging. Fueling is normally controlled to 99.5% of the maximum speed or 1854 RPM to avoid surging. The engine automatically transitions from dual-fuel mode to 100% liquid fuel by stopping the flow of syngas into the intake air. Only a slight variation in engine performance is observed when making these transitions.

Modifying an engine to use less than 20% liquid fuel injection rate at full load is possible. SUNY Cobleskill has demonstrated operating mechanically injected diesels dual fueled with over 96% reduction in liquid fuel usage. Although this is possible, numerous technical problems arise. The greatest problem being pre-ignition and detonation that eventually causes internal engine damage. Fuel savings in excess of 80% are possible using electronic engine controls, but further research would be required, including the need for altering engine electronic control systems.

Turbo charging increases the mass flow and compressive pressure within the engine. For every atmosphere of boost pressure, the flow doubles (if intercooled to the original temperature before injecting into the engine). A 3.0 liter naturally aspirated engine will have a suction air flow of 95 cubic feet per minute at standard conditions (SCFM). Applying a turbo charger to boost the air pressure in the intake manifold to 14.7 psi gauge will result in an isentropic discharge temperature of 186 °F. If an intercooler is not used to cool the air, the flow into the engine increases to 156 SCFM. If an intercooler cools the air to 100 °F before entering the engine, the flow further increases to 180 SCFM. Intercooling increases the density of the air, which increases the aspiration rate.

The cylinder pressure at top dead center also varies with the turbo pressure. An engine that has a compression ratio of 18:1 will have maximum cylinder pressure of 250 psi naturally aspirated. Turbo charging the intake manifold on the same engine to 14.7 psi gauge will increase the cylinder pressure to 515 psi, resulting in a significant power increase. The main purpose of a turbo charger is to get significantly more power out of a smaller engine. Turbo charging also helps to regulate emissions on modern engines.

Ultra-low energy syngas has a specific gravity of 0.9 to 0.95 with thermodynamic properties similar to air (ratio of specific heats). Feeding syngas into a turbo charged engine has negligible effect on the aspiration, other than displacing air.

A turbo charger normally operates at a rotational speed of 70,000 to 90,000 rpm. The syngas must be free of condensable tars and particulates to prevent accumulation on the turbine blades of the compressor. Any accumulation will cause the turbine to operate out of balance, causing vibration, bearing damage, and eventual failure. A naturally aspirated engine* is desirable over turbo charged engines due to this concern. Figure C-2 shows the gas feed controls for a turbo charged diesel engine.

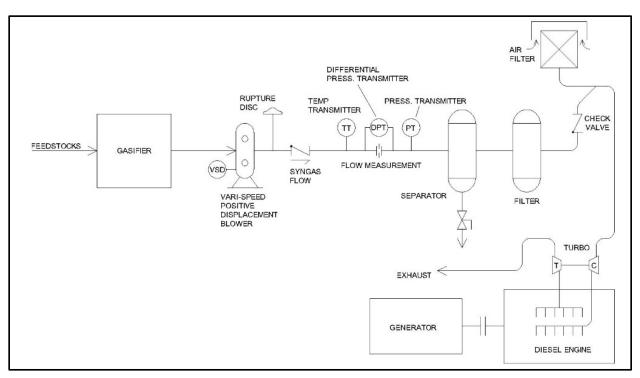


Figure C-2. Feeding Syngas into a Turbo Charged Diesel Engine.

Diesel engines operate with almost no power loss (less than 10%) when dual fueled on ultra-low energy syngas using this method. The governor maintains engine power by varying the liquid fueling rate to maintain the required crankshaft speeds. The engine must operate with excess oxygen in the exhaust stream to maintain power. Excessively weak syngas will displace

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^{*} Unfortunately, naturally aspirated diesel engines are not readily available commercially, as manufacturers move towards universal turbo-charging to obtain higher power with smaller displacement.

combustion air and could cause the engine to crash stop due to the lack of adequate oxygen. An oxygen sensor is normally used in the exhaust to avoid over-fueling with syngas.

C.5 Comparing Diesel and Otto Spark Ignition Engines

Diesel engines are commonly preferred for generator applications over Otto I/C spark ignition engines mostly due to the ability of the engine to increase torque while maintaining shaft speed under sudden increases in load. Diesel engines operate under an entirely different thermodynamic cycle than do I/C spark ignition engines. Diesel engines operate at constant pressure (isobaric) for a significant portion of the stroke as the piston travels from top dead center to bottom dead center in the cylinder. This allows the greatest amount of torque to be placed onto the crankshaft by applying full force at the mid-stroke position.

The thermodynamic efficiency of most modern diesel engines varies from 30 to 43%. Otto I/C spark ignition engines vary from 15 to 28%. The thermodynamic cycle of the Otto engine varies dramatically from a diesel. Ignition in an Otto engine results in a severe pressure spike that rapidly decreases as the piston travels from top dead center to bottom dead center. This provides significantly less torque at the mid-stroke position.

Test data indicates a loss of thermodynamic efficiency when operating diesel engines dual-fuel on syngas. The hypothesis conclusion is the engine transitions from a diesel to an Otto when increasing the fueling rate of syngas. Dual fueling may result in a quasi "Otto-diesel" cycle. The gross thermodynamic efficiency of a Yanmar 4TNV88 naturally aspirated diesel engine drops from 38% to 26% when operating on 83% gaseous syngas and 17% liquid fuel.

C.6 Otto Spark Ignition Engines

Numerous parameters must be considered when applying spark ignition engines. Octane number is the resistance to pre-ignition used for gasoline engines. Traditionally, high octane fuels explode at a slower rate, allowing the use of high compression engines and the advancement of spark ignition. This increases power output without pre-ignition or detonation.

Pre-ignition and detonation are abnormal forms of combustion within the cylinder. Pre-ignition is when the mixture explodes in the cylinder before the spark plug fires. Detonation is unexpected accelerated combustion after the spark plug fires. The result of these problems is knocking, which eventually causes severe internal engine damage.

Octane is not a representative reference for gaseous fuels. The gas engine industry has adopted the methane number system as a means to equate a fuels resistance to pre-ignition and detonation. The methane number scale equates the value of 100 with methane and 0 (zero) with hydrogen. Hydrogen is a very fast burning gas prone to pre-ignition and detonation. Mixtures of gases fall between.

The main design issues to avoid pre-ignition and detonation are the following:

- compression ratio
- ignition timing
- air temperature entering the cylinder

• engine power de-rating.

The engine timing must be adjusted to avoid pre-ignition and detonation. This adjustment is normally made based on methane number. Modern engines use sensors and electronic engine controls to vary the ignition timing to avoid these problems. Advancing ignition timing increases engine power and retarding ignition timing reduces engine power. A gas with a low methane number (with appreciable hydrogen content) will require the retarding the ignition timing, resulting in a power loss.

The second parameter of concern is Relative Power Capacity (RPC). RPC is used to determine the power loss of an engine due to fueling energy loss. RPC is the ratio of specific LHV of the fuel-air mixture (SLHV) of the fuel gas compared to natural gas. SLHV is the energy content of the fuel gas divided by the total flow into the engine (units are BTU/SCF). The ratio is a direct representative of power loss.

As discussed previously, maintaining crankshaft speed is nearly impossible when using intake throttling when fueling the engine on 100% ultra-low energy syngas. Figure C-3 shows the minimum gas controls that are necessary to feed syngas into an internal combustion spark ignition engine. Although, this arrangement is possible, fast response of gas controls to meet changes is power demand is highly questionable, even using the most modern electronic controls. A main gas energy (BTU adjustment) valve is required to change the flow of gas based on the LHV. The changes of gas flow and combustion air are dramatic for ultra-low energy syngas. A combustion based gas analyzer would be required to determine the LHV of the gas on a continual basis to maintain proper fuel metering. Gas controls also requires extensive use of pressure regulation devices for precision metering. In theory, the use of multiple pressure regulators is an acceptable means for gas regulation, but in practice, regulators have numerous mechanical problems when operating on syngas and have been found to be unreliable.

The presence of hydrogen within the syngas mixture presents numerous problems with operating spark ignition engines. Most of the gaseous fuel engines operating on natural gas, landfill gas, and digester gas are high compression diesel engines modified to operate as Otto spark ignition engines. High hydrogen content in the syngas mixture will lower the methane number and may prevent a traditional high compression gas engine from operating properly on syngas.

C.7 Power Loss of Otto Spark Ignition Engines

Unlike diesel engines, Otto spark ignition engines experience a significant power loss when operating on ultra-low energy syngas. The main power loss is from RPC. Ultra-low energy syngas requires a high flow of both fuel gas and air to enter the engine to develop power. Power loss results from the SLHV being too dilute. Partial power gains are possible by turbo or super charging.

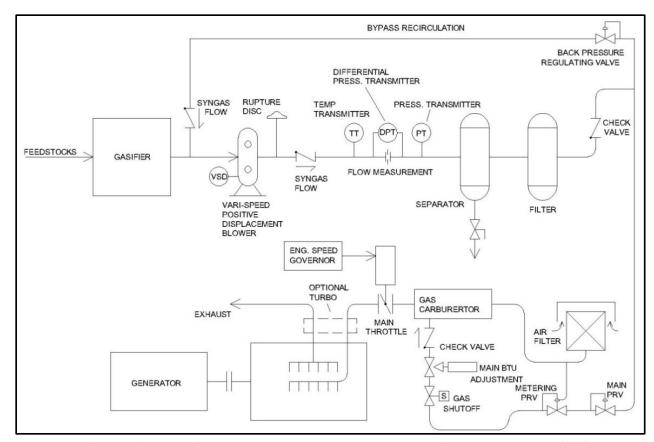


Figure C-3. Minimum Controls to Feed Ultra-Low Energy Syngas into and I/C Spark Ignition. Engine

The second main cause for power loss is pre-ignition and detonation (methane number). Engines must operate at retarded ignition timing and at lower compression ratios.

C.8 Hybrid Otto – Diesel Spark Ignition Engines

The hybrid Otto-Diesel spark ignition engine was developed by SUNY Cobleskill* to address the problems of operating an Otto spark ignition engine on ultra-low energy syngas. The advantages of both engines were combined. The primary focus was to modify the Otto spark ignition engine to handle gaseous fuel mixing and air control identical to a diesel.

The SUNY engine is designed to operate without a governor. Crankshaft speed is electrically controlled by the natural induction properties of the generator. The flammability limit of syngas is approximately 4.5% to 75%, allowing a wide range of air to fuel ratios where the engine will run.

The induction generator acts as a motor and spins the engine when grid power is applied. Syngas is fed into the intake air, ignition occurs, and the engine runs over a wide range of air to fuel ratios. The amount of syngas flow increases, allowing the engine to put mechanical power into

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^{*} Note that this work is not being pursued under SERDP funding, but is discussed here to fully address the topic. This technology may be pursued for military application at a later date under a separate program.

the electric motor. The induction motor transitions into a generator when the crankshaft exceeds the synchronous speed. Electrical power is pushed backwards from the generator onto the local grid for baseline use. The amount of power generated varies with the energy content and flow of the syngas fuel provided to the air intake. The engine continues to operate as long as the air to fuel ratio is within the wide range of flammability limits of the syngas. Research has determined this would be a very efficient method for electrical generation using ultra-low energy waste derived syngas.

The mixture of air and gaseous fuel enter the engine un-throttled. The flow of gaseous fuel is metered into the engine based on the engine speed. The flow of syngas increases until the engine reaches the speed that provides the maximum power output of the generator (synchronous speed plus the slip or the rated full load amps of the motor). The second limitation is sufficient excess air must exist for complete combustion. The limitation is to operate the engine similar to a diesel, with at least 3% excess oxygen in the exhaust stream. Figure C-4 shows the configuration required for the SUNY generating system.

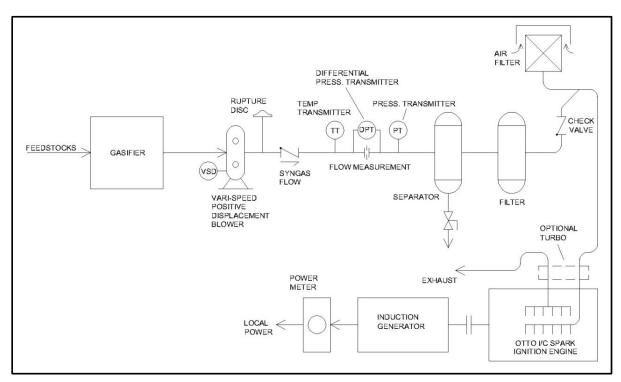


Figure C-4. Hybrid Diesel-Otto Generating System for Ultra-Low Energy Syngas.

The design approach is as follows:

- 1. Use a naturally aspirated engine to avoid turbo problems operating on syngas.
- 2. Use a standard gasoline engine with a low compression ratio (7:1 to 8.5:1) to avoid preignition and detonation problems operating on syngas with a low methane number.
- 3. Oversize the engine (with a gasoline power rating 2.2 times) larger than the generator to accommodate for power loss and to minimize NOx formation.
- 4. Operate the engine at 3600 rpm to maximize power output.

This generation method is perfect for micro-grid applications. The application of smart grid technologies can enable precision load matching to regulate the syngas production of the WTE system to meet the baseline generation needs of the micro-grid. Battery / inverter based alternative energy systems can be tied directly to the induction generator for syncing power. This arrangement allows the SUNY generation system to meet the power demands and simultaneously back feed through the inverter to charge the battery bank.

A 2.2 kW hybrid Otto-Diesel generator was developed by SUNY Cobleskill and tested for over 200 hours on downdraft syngas by an intern. The results of operating this generator on various fuel gases are available in a separate report.

C.9 Generating Electricity

Most applications require alternating current (AC) electrical power. Power is generated at either 50 or 60 Hz. Most power in the Americas is 60 Hz. 50 Hz is prevalent in some foreign countries. Common generating voltages for 60 Hz applications are 480 VAC for 3-phase applications under 250 kW. Residential applications use smaller generators that operate on single phase 120/240 VAC power.

C.9.1. Alternating Current

Alternating current that changes polarity at a rate of 60 times per second (60 Hz) is required in the United States. Generators must operate at constant synchronous speed to provide frequency control based on the windings of the generator head as follows:

- Two Pole 3600 rpm
- Four Pole 1800 rpm
- Six Pole 1200 rpm.

Most generator engines have a precision governor that regulates the engine speed within 2% of the required synchronous speed of the generator. For example, a four pole generator with a traditional mechanical governor will operate at 1860 rpm at no load and 1785 rpm at full load. The frequency varies from 62 Hz at no load to 59.5 Hz at full load.

Modern generators use electronic governor control. The electronic engine control module (ECM) uses with proportional integral derivative (PID) logic to regulate the engine speed at exactly at the synchronous speed. Frequency control can be within 0.1 Hz at varying electrical loads.

C.9.2. Inductive and Resistive AC Loads

The type of load must be considered when applying a generator. Inductive loads are applications where the electricity is used to drive magnetic devices, such as electric motors. Resistive loads are applications where the electricity is used for lighting or resistive heating.

Inductive loads create numerous electrical issues. Electric motors take a significant amount of inrush current to start, especially if the motor is connected to a high inertial load. The generator must be able to maintain synchronous speed when starting electric motors. Normal inrush current

can be over six times the full load operating current when direct starting across the line. The inrush current can be reduced using more complex switchgear or soft starters.

If the engine cannot provide enough power to maintain synchronous speed when starting an inductive load, the frequency and voltage will also drop with the generator speed, causing the electric motor to draw significantly more current. The result could turn into a runaway situation where the generator engine may not be able to create sufficient shaft power, causing the engine to lug or crash stall before electrical safety equipment disconnects the load.

Unlike inductive loads, resistive loads have minimal or no inrush current when starting. The starting inrush current is normally equal to the operating current. A properly sized generator can easily maintain synchronous speeds when energizing resistive loads.

A severe voltage spike may occur if the electrical load suddenly disconnects when the engine is lugging under the synchronous speed. Significant electrical damage may occur to wiring, busses, switchgear, and sensitive electronics when the generator is momentarily operating more than 3% over or under the synchronous speed.

C.9.3. Selecting Generators

The generator size is selected based on the sum of inductive and resistive loads. Common practice is to operate a generator at 20% to 30% load to provide sufficient reserve to start inductive loads.

Load control must be considered to ensure the generator has enough reserve power to start inductive loads. Most generators are sized for 3 to 6 times more capacity than the largest inductive load. For example, a 45 kW generator will provide ample power to start an air conditioner compressor with a 10 HP motor across the line if no other loads are connected. The generator will run at 17% load once the compressor is running. Resistive loads can be added after the inductive load is running. Load management is necessary for equipment that starts and stops automatically. Soft starters or variable frequency drives will allow the use of a smaller generator, but these devices are sensitive to generator power variations due to poor speed control.

C.9.4. Grid Power

Grid power provides an essentially infinite amount of energy to start inductive loads. The flow of electricity is limited only by transformer, wire, and switchgear capacities. Grid power provides a significant advantage over rotary generators by providing infinite resources to maintain frequency control at exactly 60 Hz when drawing heavy inrush current after connecting an inductive load.

C.9.5. Direct Current Power Generation

Generating direct current (DC) provides numerous advantages when operating a generator on syngas. The main advantage is dramatic engine speed variations do not matter when using a rectified field excited alternator. This type of system normally requires a battery bank and a DC to AC solid state inverter. This equipment is complex and is not well suited for military applications due to extensive use of solid state circuitry that is sensitive to static and dirty power.

Direct power generating systems are ideally suited for joint alternative energy systems (wind, solar, etc.) that normally operate on DC power. An internal combustion engine-driven DC generator can be used to provide baseline power and quick battery charging.

The overall feasibility of a DC power grid for contingency operations could be the subject of a future study.

C.10 Summary and Conclusions

Diesel generators are the most simple and reliable method to generate power from waste derived syngas, making them the obvious choice for military applications. Unfortunately, liquid fuel is required to operate a diesel generator on syngas, albeit at much lower usage rate for a given electrical output. Given the robust and flexible diesel engine generators, the present project team recommends, and will continue to develop a diesel WTE solution.

Otto spark ignition engines offer the ability to operate on 100% syngas without the need for secondary pilot fuels. Unfortunately, operating a spark ignition engine with a traditional gaseous fuel delivery system on ultra-low energy syngas is difficult and complex. Significant electrical damage will occur if the engine speed is not kept within 3%. A momentary over-speed or underspeed condition will cause power spikes that can severely damage electrical equipment.

The SUNY generating concept uses a hybrid Diesel – Otto engine directly coupled to an induction generator to address the issues with operating a spark ignition engine on ultra-low energy syngas. The generator operates nearly identical to a diesel driven unit without the need for a secondary fuel. This system does require an existing power network, and cannot operate independently.

Appendix D: Patent Application

The research team is pursuing intellectual property rights for the IIFPRG technology. The intention is that the DoD would have complete rights to develop and deploy this system, while the SUNY Research Foundation could pursue commercial or municipal markets. This section contains the Record of Invention forms, filed through the Research, Development, and Engineering Command (RDECOM).

INSTRUCTIONS FOR PATENT DISCLOSURE DATA RECORD AMCCOM FORM 384-R

The following Technical Requirements must be included in the Descriptive Write Up Section:

The Patent Disclosure Data Record should contain replies to the following:

1. What problem does your invention solve? How long has the problem existed?

2. What old ways are available for solving the problem?

- 3. Why were the old ways unsatisfactory for solving the problem?
- 4. What are the new results and advantages of your invention?
- 5. Describe your invention. Include:
 - a. Reproduction of drawings or sketches number all elements.
 - b. Name, reference, and describe function of numbered elements.
 - c. List changes, additions, or improvements over the old ways.
 - d. Indicate briefly, alternate methods of construction or composition.
- e. For basic inventions note scientific principle upon which it is based, if known.
 6. State sequence of operation of your invention, if applicable and not already included under (5).

Each inventor must sign and date each sheet of the disclosure and each reproduction of drawings. Also, two (2) witnesses who have read and understand the disclosure must sign and date each sheet of the disclosure and each reproduction of drawings.

Attach any pertinent literature, such as reports, which may aid in the preparation of a patent application.

NOTE: Reports are useful in preparing the patent application and should be supplied where available. However, reports cannot take the pace of this disclosure, and should not be provided for that purpose only.

NOTE: In cases in which there is more than one inventor, all inventors must have contributed to the invention in order to be included as joint inventors. Improper joinder of inventors can result in the invalidity of any resulting patent. Any questions in this regard should be referred to the ARDEC attorney handling the case.

Electronic Instructions:

Fill out the gray areas of the forms USING Microsoft Word.

Reproductions of pertinent drawings or sketches can be attached to the printed forms. These drawing must also be submitted electronically. Sign and date each sheet of disclosure and each reproduction of drawings. Forward the completed forms to lorilee.andrews@us.army.mil

PATENT DISCLOSURE DATA RECORD (FOR ATTACHMENT TO MILITARY INVENTION RECORD) (AMCCOMR 27-2)

Page Number:	Number of Pages:	Docket Number (Fil	led in by Legal Office:
Title of Invention:	Inclined Indirect Flamin	g Pyrolysis Rotary Gas	sifier (IIFPRG)
REFERENCE DATA LABORATORY OF OTHER	A R ENGINEERING NOTEE	BOOK NUMBER	PAGES
DESCRIPTIVE WR	ITE UP (Include sketches	s separately)(This box	will expand as needed,
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INVENTOR(S)		WITNESSED AND	UNDERSTOOD BY:
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AMCCOM FORM 384-R CONTINUATION PAGE FOR DESCRIPTIVE WRITE UP (AS NECESSARY)

1) Problem Solved:

Converts solid and liquid wastes to a synthetic fuel gas similar to natural gas with minimal or no feedstock preparation. Possible feedstocks include fuel crops, wood chips / byproducts, hay, straw, coal, agricultural wastes, municipal solid wastes, tires, lubricants, plastics, munitions, sewage sludge, construction and demolition debris, etc. Any feedstock that burns with an open flame can be processed. Technology will handle dripping wet feedstock, which is a common problem with most wastes. Produces a gas that can fuel an engine, allowing the only emission source to be engine exhaust, not incinerator flue gas. Flammable liquids, such as waste lubricants, can be added to feedstock. Metals, glass, soils, and other inert items simply pass through the gasifer and discharge with the ash. The only products from the process are ash and synthetic fuel gas.

2/3) Old Ways/ Competitive or Alternative Products

Stratified downdraft gasifiers (CPC, ISG). Rotary kiln gasifiers (direct and indirect). Plasma gasifiers. These alternative products are less effective and have operational issues when dealing with product waste streams.

4) Advantages:

No feedstock preparation (garbage truck approach). Handles dripping wet feedstock. Converts wastes to electrical and heat energy, or liquid fuels. Reduces mass of wastes by 80 to 98%. Reduces volume of wastes by up to 98%. Reduces volume of wastes sent to landfills and associated trucking costs. Reactor operates at intense temperatures, insuring full thermal processing. Gas is scrubbed clean prior to final combustion. Waste heat can be recovered for space and water heating. Only emission source is engine exhaust. Significantly different approach to incineration. Fully automated, does not require human operator.

a) Disadvantages

May be maintenance intensive. Diesel engine emissions are a problem with new stringent EPA regulations. Co fueling is not economical. Waste water disposal may be a problem. Long term reliability must be proven.

5) Description of the Technology

Main purpose is to convert solid and liquid feedstocks into a synthetic fuel gas that burns similar to natural gas, but at a lower heating value. Gasifier is a rotating drum mounted on an incline. Feedstock is fed into the reactor from the downhill end. Reacting feedstock is used to seal the rotating drum, eliminating the need for mechanical seals and packing. Inert items such as metals, glass, soils, etc. pass thru the system quickly and discharge with the ash. Un-reacted feedstock tumbling inside the rotating drum scrubs the syngas clean of ash, tars, and aerosols. Tars are re-gasified when the feedstock reaches the reaction zone. Hot syngas passes through cool feedstock, heating and drying the feedstock. Moisture flashes off to slightly superheated steam and exits

the gasifier with the syngas. Steam is condensed back to a liquid within the scrubber. See Appendix A for further details.

Potential Products/Services

Military purposes, including waste to energy and hydrogen powered equipment. Combined heat and power for commercial and municipal buildings, schools, and colleges. Reduces landfill usage by processing municipal solid wastes at the transfer station. Sewage sludge processing. Clean coal. Ultra clean hydrogen combustion. Waste to liquid fuels. Waste to asphalt. Carbon sequestration. Distributed power generation.

Appendix A

Inclined Indirect Flaming Pyrolysis Rotary Gasifier Introduction The Inclined Indirect Flaming Pyrolysis Rotary Gasifier (IIFPRG) converts any solid feedstock directly into synthetic fuel gas (syngas) that can be used similar to natural gas, but with cleaner combustion properties. The only byproduct of the process is ash. Any flammable solid feedstock that burns with an open flame can be processed, including, but not limited to wood, energy crops, construction and demolition wastes, agricultural wastes, and municipal solid wastes. The unique inclined rotational property of the gasifier allows inert non-flammable items to be mixed with the feedstock, avoiding the need to prepare and separate feedstock prior to processing. Inert items such as metals, glass, stone products, and soils simply pass thru the system and are discharge out of the gasifier with the ash. The gasifier is able to process solid feedstock without the need of pre-drying. The feedstock handling system uses a hydraulically powered piston to compact the wastes to drive feedstock into the gasifier and mechanically squeeze out excess water. The compressed feedstock acts as a material seal to prevent the entrance of air into the rotary gasifier at the feed point. The gasifier incorporates an inclined rotating drum that is mounted on an aggressive incline, allowing feedstock mixed with inert items to tumble downhill toward the reaction zone. Hot syngas must pass thru raw tumbling feedstock. Feedstock moisture is evaporated to steam that exits the gasifier with the syngas. Steam is condensed back to liquid water in the condenser portion of the scrubber. Hot syngas also directly contacts cool raw tumbling feedstock. Complex hydrocarbon aerosols, in the form of tars, condense on the cool raw and tumbling feedstock to scrub the gas clean as it exits the gasifier. The gasifier automatically cracks these tars as the feedstock is processed within the reaction zone. Flammable liquids, such as used engine oil and lubricants, can be mixed with the solid feedstock and gasified or injected separately. The gasifier consists of a totally enclosed rotating shell that is mounted on a substantial incline. All thermo-chemical reactions occur within the rotating shell. The design does not use any mechanical seals to prevent the leakage of air into the reactor. The reacting feedstock within the shell acts as the seal between stationary and rotating elements. The IIFPRG also has a non-rotating cylindrical chamber that encloses the rotating shell. Extra thermal energy is transferred into the rotating shell to dry wet feedstock. Thermal energy is provided preferably from engine exhaust or by cyclonically combusting a portion of the syngas within the annulus between the stationary and rotating shells. If the thermal energy required to vaporize feedstock moisture exceeds the available energy in the fixed carbon, a portion of the gas produced by the gasifier can be burned on the outside of the gasifier shell to provide additional thermal energy. The unique design of the IIFPRG allows the processing of dripping wet feedstock for the following reasons:

1. Excess water is removed using super-compression prior to feeding feedstock into the

gasifier.

- 2. Remaining moisture within the feedstock vaporizes to steam that is slightly superheated.
- 3. A non-rotating cylindrical chamber encloses the rotating shell allowing heat to transfer into the rotating shell to support the drying of wet feedstock. Thermal energy can be provided from engine exhaust or by combusting un-used syngas. Steam immediately mixes with the exiting syngas and leaves the gasifier. The design prevents steam escaping from feedstock moisture from reacting with the red hot burning char zone, saving about 65% of the thermal energy to superheat the steam to 1800 deg. F and thermo-chemically split the steam into additional hydrogen and carbon monoxide.
- Steam that is slightly superheated, mixes with the syngas exiting the gasifier and is condensed to liquid water in the scrubbing system.
- 5. The recovered condensate (waste water) may be injected into the back of the IIFPRG to force the highly endothermic water-gas reaction, where water passing over hot carbon is split into flammable gas using the chemical reaction of $H2O + C \rightarrow H2 + CO$. Water also generates additional hydrogen gas by the slightly exothermic water gas shift reaction of $H2O + CO \rightarrow H2 + CO2$.
- 6. Remaining waste water is vaporized to steam using engine exhaust. The flammable gas created by the IIFPRG must be quenched in temperature, cleaned of particulates and tar aerosols, and dried prior to feeding an engine. The scrubber is a unique design that quenches the temperature of the gas from high temperatures, power washes the gas multiple times using high pressure oil, pumps the gas using a unique jet arrangement, and then dries the gas to remove excess moisture all in one vessel. Depending on the application, high sulfur feedstock may require the removal of sulfur from the fuel gas using a dry powder fluid bed scrubber. The resulting syngas can be used in a manner similar to natural gas, but is most ideally suited to operate a stationary internal combustion engine driven generator. Other uses for the syngas include direct combustion for heating purposes, powering steam turbines, and fueling gas turbines. The IIFPRG is ideal to generate a syngas that is rich in hydrogen content when blown with oxygen instead of air. Hydrogen rich syngas is ideal for military purposes, such as propellants, fuel cells, and liquid fuel synthesis. Hydrogen fuels for combustion are of interest since the main combustion product is water vapor.

Main Features

- 1. Directly converts wet wastes into a flammable gas that can be used to fuel combustion equipment and engines.
- 2. Able to process dripping wet wastes by management of thermal energy.
- 3. Non-flammable feedstock does not need to be separated from flammable feedstock.
- 4. Gasifier is infinitely scalable.
- 5. The size of the feedstock handling system is proportionate to the gasifier size. Shredding feedstock on larger systems is not necessary, since the feedstock handling system will be able to handle large chunk sizes.

- 6. The rotating drum allows feedstock to continually tumble, allowing complete exposure to reaction surfaces.
- 7. Design allows tar to condense on un-reacted feedstock entering the gasifier, partially scrubbing the gas prior to exiting the gasifier.
- 8. Gasifier has no mechanical rotating seals. Reacted feedstock is used to seal between rotating and stationary elements.
- 9. The high heating valve of the gas is improved by removing in excess of 95% of the moisture in the syngas fuel prior to final combustion.
- 10. Operating on carbon rich feedstock, using oxygen as blowing gas, and injecting water into the combustion zone of the gasifier allows the generation of syngas that consists primarily of hydrogen gas and carbon dioxide. Carbon dioxide can be separated, resulting in a fuel gas consisting primarily of hydrogen for military purposes, fuel cells, liquid fuels, and ultra clean combustion processes.

Detailed Process Description Rotary Gasifier

Refer to drawing SUNY Cobleskill Center for Environmental Science and Technology Drawing # 010713-2-03.

The Inclined Indirect Flaming Pyrolysis Rotary Gasifier (IIFPRG) consists of a rotating cylindrical shell 201 that is mounted on incline angle 210. The preferred angle is about 22 degrees, but may be more or less depending on the geometry of the unit. Shell 201 rotates by a chain drive, but a variety of other driving methods may be used, including traction drive and bull gear. A stationary center tube 211 is mounted as a cantilever in

the exact center of rotation of rotating shell 201 and is anchored at 212. The inside diameter of rotating shell 201 is lined with refractory 207 for length 213. Feedstock 113 is pushed up stationary feed tube 202 and enters at 214. The area of the feed tube increases by at least 80% at 214 to allow feedstock to decompress and spread apart. Chunks of partially decompressed feedstock are pushed up stationary feed tube 202. Heat from hot exiting syngas 205 transfers into the incoming raw feedstock to dry and de-volatilize by indirect pyrolysis. Steam, gas, and feedstock discharge at the end of the feed pipe 202 at point 203. Feedstock 203 falls into rotating shell 201 and tumbles downhill 215 toward refractory lined section 207. Air enters the gasifier thru small gaps 216 and burns de-volatilized feedstock as fixed carbon with red hot burning coals 217. An abrupt line between raw feedstock and red hot burning coals forms at 218. High levels of heat from burning coals 217 directly contacts raw feedstock 219 tumbling downhill, causing flash gasification of feedstock on gasification interface line 218. Syngas 220 laden with tars must flow thru raw tumbling feedstock 219. Tar aerosols in syngas 220 condense on the raw tumbling feedstock 219, scrubbing the gas of aerosols and particulates prior to exiting the gasifier chamber at port 204. Tars and ash that become imbedded in the raw feedstock are reprocessed when the feedstock 219 tumbles down to gasification interface 218. Raw feedstock 219 is continually gasified to burning char coals 217, which are evenly dispersed around the entire annulus. Ash 224 discharges from the bottom spring plate 225, either thru the air entrance gaps or thru ash dump door 223. Slag, metals, glass, soil, etc. also withdraw from the gasifier thru ash dump door 223. Partially scrubbed syngas enters the gas withdrawal pipe 222 thru discharge port 204 and flows down eccentric annulus 205 between feed tube 202 and gas withdrawal tube 222. Gas exits the gasifier using pipe 206.

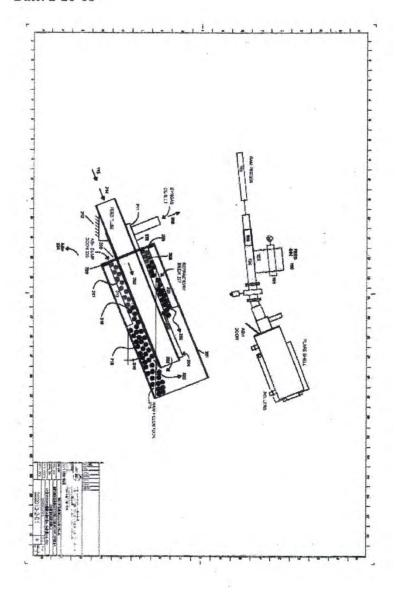
The energy value of the syngas produced can be improved by using oxygen enriched air or 100% oxygen as blowing gas instead of using air. The use of oxygen instead of air reduces the amount of nitrogen that enters the system with the air. Nitrogen dilutes the syngas and lowers the heating value. Refer to drawing 011513-2-01. Oxygen is injected

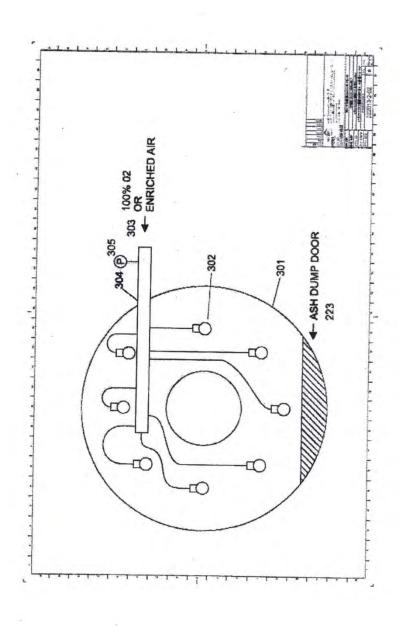
thru multiple tuyeres evenly spaced on flexible spring plate 301, which is mounted on the bottom end of gasifier 201. The flow of oxygen or enriched air 303, enters pipe 304 at pressure 305, and is evenly distributed around the annulus using injection tuyeres 302. The flow of blowing gas is based on pressure 305 and is varied until the pressure on the opposite side of spring plate 301 is slightly positive on the inside surface of spring plate 301 within the gasifier.

David Waage

Research Foundation of SUNY

SUNY Cobleskill Date: 2-20-13





RECORD OF INVENTION
(AMC-R 825-2)
(To be attached as cover sheet to detailed description of the invention)

NAME OF INVENTOR(S) David Waage	2. HOME ADDRESS OF INVENTOR(S) WITH ZIP CODE SUNY Cobleskill			ÞΕ	3. E-mail address + work phone number 5182555312
Gary Collins	SUNY Cobleskill			5182555312	
Philip Darcy	-	Benet Labs			5182664534
Paul Redner (more inventors listed below under #6)	AR	ARDEC			
4. Invention Title: Inclined In	ndir	ect Flaming	Pyrolysis Rota	ry Ga	sifier (IIFPRG)
(a) Conception of Invention		Date 2/20/13	Place of Actio	n or N	lame of Persons 1 SUNY Cobleskill
(b) First Sketch or drawing				11	
(c) First written description					
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Appendix E Analysis of Syngas and Exhaust



ANDREW M. CUOMO Governor HOWARD A. ZUCKER, M.D., J.D. Commissioner

SALLY DRESLIN, M.S., R.N. Executive Deputy Commissioner

Gasification of Forward Operating Base Wastes

Strategic Environmental Research and Development Plan – US Army Corps of Engineers

State University of New York Research Foundation, Cobleskill, NY

Wadsworth Center for Laboratories and Research

Analysis of Syngas and Diesel Exhaust Gas Samples Summary

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SALLY DRESLIN, M.S., R.N. Executive Deputy Commissioner

The following is a summary of the analysis of whole air gaseous samples submitted to the New York State Department of Health Wadsworth Center in support of a research project investigating the conversion of combustible waste into a flammable synthetic gas (Syngas) suitable for the operation of diesel engines.

Sample Collection: The Syngas and Diesel exhaust gas samples were collected in certified pre-cleaned 6-liter whole air Summa[®] canister, (Fig.1) supplied by the Wadsworth Center.



Fig 1. Summa canister for Syngas sampling



ANDREW M. CUOMO

Governor

HOWARD A. ZUCKER, M.D., J.D.

Commissioner

SALLY DRESLIN, M.S., R.N. Executive Deputy Commissioner

Upon sample receipt, the canisters were allowed to sit overnight to equilibrate before making appropriate sample dilutions. Dilutions were made directly, canister to canister, by removing known volumes from the source canister to the dilution canister through the use of a critical orifice flow restrictor fitting. Fig 2. The diluted samples were allowed to stand overnight at room temperature to equilibrate before being analyzed.



Fig 2. Canister dilution with critical orifice fitting



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Sample Analysis: The canister samples were analyzed using whole air instrument #1, following USEPA TO-15 methodologies. The system consists of an Agilent 6890⁺/5975B GC/MSD (fig 3) connected to an Entech 7150/7500A/7016C pre-concentrator, autosampler inlet system. (fig 4 & fig 5).



Fig 3. Agilent 6890+/5975B GC/MSD



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Fig.4 Entech 7150/7500A sample pre-concentrator/inlet system



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Fig 5. Entech 7016C canister autosampler

The canisters were attached to a numbered sampling position on the 7016C autosampler via a Swagelok fitting. A known volume of the sample was accurately and reproducibly removed from the canister through a closed loop system and concentrated at the cryogenically controlled trap. After equilibration, the trap was heated to move the sample onto the chromatographic column, leading to the mass selective detector.

The total ion chromatograms are located on pages 39 to 50. The results are listed on the following pages.

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Data Analysis: Analysis of the GC/MSD data was accomplished using Agilent Environmental MSD Chemstation build 75, NIST Mass Spectral 2002 database and NIST AMDIS v2.1. The results calculated for the target analytes are based on the total area counts for a specific mass at a precise retention time as compared to the reference standard analyzed under the same conditions at different concentrations.

Target analyte results for the SynGas Long Term Mix

	SynGas_Long Term Mix 1 Analyte	ppmV		SynGas_Long Term Mix 2 Analyte	ppmV
2	Propene	45086.40	2	Propene	17847.36
7	1,3-Butadiene	5520.96	7	1,3-Butadiene	1645.44
12	ISOPRENE	12730.56	12	ISOPRENE	3312.96
14	ACETONE	1661.76	14	ACETONE	2001.60
15	n-HEXANE	188.16	15	n-HEXANE	66.24
21	METHYL ETHYL KETONE	454.08	21	METHYL ETHYL KETONE	512.64
27	CYCLOHEXANE	0.00	27	CYCLOHEXANE	15.36
31	n-HEPTANE	82.56	31	n-HEPTANE	92.16
33	BENZENE	17110.08	33	BENZENE	8544.00
35	METHYLCYCLOHEXANE	0.00	35	METHYLCYCLOHEXANE	7008.00
42	TOLUENE	3370.56	42	TOLUENE	2724.48
51	n-NONANE	256.32	51	n-NONANE	272.64
53	ETHYLBENZENE	205.44	53	ETHYLBENZENE	800.64
54	M,P-XYLENE	247.68	54	M,P-XYLENE	337.92
55	O-XYLENE	54.72	55	O-XYLENE	125.76
56	STYRENE	207.36	56	STYRENE	2669.76
59	ISOPROPYLBENZENE	25.92	59	ISOPROPYLBENZENE	238.08
61	n-DECANE	116.16	61	n-DECANE	365.76
62	n-PROPYLBENZENE	72.96	62	n-PROPYLBENZENE	356.16
63	1,3,5-TRIMETHYLBENZENE	3.84	63	1,3,5-TRIMETHYLBENZENE	21.12
65	1,2,4-TRIMETHYLBENZENE	4.80	65	1,2,4-TRIMETHYLBENZENE	51.84
67	d-LIMONENE	65.28	67	d-LIMONENE	560.64
68	p-ISOPROPYLTOLUENE	65.28	68	p-ISOPROPYLTOLUENE	84.48
70	1,2,3-TRIMETHYLBENZENE	20.16	70	1,2,3-TRIMETHYLBENZENE	126.72
72	n-UNDECANE	30.72	72	n-UNDECANE	170.88
75	n-DODECANE	7.68	75	n-DODECANE	41.28
78	Naphthalene	5.76	78	Naphthalene	6.72



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Target analyte results for the SynGas 100% Construction Mix

	SynGas_100% Construction Mix 1			SynGas_100% Construction Mix 2		
	Analyte	ppmV		Analyte	ppmV	
2	Propene	24061.44	2	Propene	8682.24	
7	1,3-Butadiene	3793.92	7	1,3-Butadiene	1085.76	
12	ISOPRENE	5611.20	12	ISOPRENE	1588.80	
14	ACETONE	6401.28	14	ACETONE	2314.56	
15	n-HEXANE	305.28	15	n-HEXANE	56.64	
21	METHYL ETHYL KETONE	2133.12	21	METHYL ETHYL KETONE	502.08	
27	CYCLOHEXANE	18.24	27	CYCLOHEXANE	0.00	
31	n-HEPTANE	224.64	31	n-HEPTANE	48.96	
33	BENZENE	11040.96	33	BENZENE	4993.92	
35	METHYLCYCLOHEXANE	195.84	35	METHYLCYCLOHEXANE	74.88	
42	TOLUENE	3431.04	42	TOLUENE	2048.64	
51	n-NONANE	1550.40	51	n-NONANE	725.76	
53	ETHYLBENZENE	526.08	53	ETHYLBENZENE	589.44	
54	M,P-XYLENE	663.36	54	M,P-XYLENE	386.88	
55	O-XYLENE	258.24	55	O-XYLENE	154.56	
56	STYRENE	776.64	56	STYRENE	1738.56	
59	ISOPROPYLBENZENE	340.80	59	ISOPROPYLBENZENE	215.04	
61	n-DECANE	2269.44	61	n-DECANE	500.16	
62	n-PROPYLBENZENE	1057.92	62	n-PROPYLBENZENE	24.00	
63	1,3,5-TRIMETHYLBENZENE	117.12	63	1,3,5-TRIMETHYLBENZENE	35.52	
65	1,2,4-TRIMETHYLBENZENE	350.40	65	1,2,4-TRIMETHYLBENZENE	92.16	
67	d-LIMONENE	0.00	67	d-LIMONENE	511.68	
68	p-ISOPROPYLTOLUENE	503.04	68	p-ISOPROPYLTOLUENE	139.20	
70	1,2,3-TRIMETHYLBENZENE	834.24	70	1,2,3-TRIMETHYLBENZENE	218.88	
72	n-UNDECANE	766.08	72	n-UNDECANE	509.76	
75	n-DODECANE	104.64	75	n-DODECANE	87.36	
78	Naphthalene	59.52	78	Naphthalene	17.28	



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Target analyte results for the SynGas 50% Food Mix

	SynGas_50% Food Mix 1			SynGas_50% Food Mix 2	
	Analyte	ppmV		Analyte	ppmV
2	Propene	25226.88	2	Propene	30874.56
7	1,3-Butadiene	4177.92	7	1,3-Butadiene	5475.84
12	ISOPRENE	7556.16	12	ISOPRENE	16854.72
14	ACETONE	2443.20	14	ACETONE	2334.72
15	n-HEXANE	60.48	15	n-HEXANE	212.16
21	METHYL ETHYL KETONE	774.72	21	METHYL ETHYL KETONE	554.88
27	CYCLOHEXANE	0.00	27	CYCLOHEXANE	0.00
31	n-HEPTANE	63.36	31	n-HEPTANE	157.44
33	BENZENE	17493.12	33	BENZENE	10201,92
35	METHYLCYCLOHEXANE	0.00	35	METHYLCYCLOHEXANE	225.60
42	TOLUENE	4141.44	42	TOLUENE	3555.84
51	n-NONANE	842.88	51	n-NONANE	557.76
53	ETHYLBENZENE	596.16	53	ETHYLBENZENE	1767.36
54	M,P-XYLENE	601.92	54	M,P-XYLENE	431.04
55	O-XYLENE	218.88	55	O-XYLENE	158,40
56	STYRENE	1081.92	56	STYRENE	5640.96
59	ISOPROPYLBENZENE	180.48	59	ISOPROPYLBENZENE	719.04
61	n-DECANE	1764.48	61	n-DECANE	546.24
62	n-PROPYLBENZENE	642.24	62	n-PROPYLBENZENE	650.88
63	1,3,5-TRIMETHYLBENZENE	43.20	63	1,3,5-TRIMETHYLBENZENE	20.16
65	1,2,4-TRIMETHYLBENZENE	112.32	65	1,2,4-TRIMETHYLBENZENE	50.88
67	d-LIMONENE	680.64	67	d-LIMONENE	1723.20
68	p-ISOPROPYLTOLUENE	165.12	68	p-ISOPROPYLTOLUENE	150.72
70	1,2,3-TRIMETHYLBENZENE	298.56	70	1,2,3-TRIMETHYLBENZENE	156.48
72	n-UNDECANE	1135.68	72	n-UNDECANE	332.16
75	n-DODECANE	160.32	75	n-DODECANE	63.36
78	Naphthalene	36.48	78	Naphthalene	22.08



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Target analyte results for the SynGas 33% POL Mix

	SynGas_33% POL Mix 1			SynGas_33% POL Mix 2	
	Analyte	ppmV		Analyte	ppmV
2	Propene	12192.96	2	Propene	31661.76
7	1,3-Butadiene	2664.96	7	1,3-Butadiene	8566.08
12	ISOPRENE	23710.08	12	ISOPRENE	27994.56
14	ACETONE	2446.08	14	ACETONE	2560.32
15	n-HEXANE	45.12	15	n-HEXANE	128.64
21	METHYL ETHYL KETONE	685.44	21	METHYL ETHYL KETONE	856.32
27	CYCLOHEXANE	35.52	27	CYCLOHEXANE	4416.00
31	n-HEPTANE	72.00	31	n-HEPTANE	95.04
33	BENZENE	7187.52	33	BENZENE	14492.16
35	METHYLCYCLOHEXANE	0.00	35	METHYLCYCLOHEXANE	0.00
42	TOLUENE	2846.40	42	TOLUENE	4820.16
51	n-NONANE	310.08	51	n-NONANE	951.36
53	ETHYLBENZENE	515.52	53	ETHYLBENZENE	1015.68
54	M,P-XYLENE	431.04	54	M,P-XYLENE	413.76
55	O-XYLENE	237.12	55	O-XYLENE	194.88
56	STYRENE	1037.76	56	STYRENE	3101.76
59	ISOPROPYLBENZENE	225.60	59	ISOPROPYLBENZENE	443.52
61	n-DECANE	1344.00	61	n-DECANE	878.40
62	n-PROPYLBENZENE	6144.00	62	n-PROPYLBENZENE	549.12
63	1,3,5-TRIMETHYLBENZENE	48.96	63	1,3,5-TRIMETHYLBENZENE	21.12
65	1,2,4-TRIMETHYLBENZENE	139.20	65	1,2,4-TRIMETHYLBENZENE	55.68
67	d-LIMONENE	934.08	67	d-LIMONENE	1637.76
68	p-ISOPROPYLTOLUENE	197.76	68	p-ISOPROPYLTOLUENE	99.84
70	1,2,3-TRIMETHYLBENZENE	317.76	70	1,2,3-TRIMETHYLBENZENE	161.28
72	n-UNDECANE	891.84	72	n-UNDECANE	609.60
75	n-DODECANE	107.52	75	n-DODECANE	98.88
78	Naphthalene	26.88	78	Naphthalene	24.00



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Target analyte results for the SynGas 40% Tire Mix

	SynGas_40% Tire Mix 1			SynGas_40% Tire Mix 2	
	Analyte	ppmV		Analyte	ppmV
2	Propene	16114.56	2	Propene	12248.64
7	1,3-Butadiene	4106.88	7	1,3-Butadiene	3944.64
12	ISOPRENE	52316.16	12	ISOPRENE	57312.00
14	ACETONE	1848.96	14	ACETONE	57361.92
15	n-HEXANE	444.48	15	n-HEXANE	106.56
21	METHYL ETHYL KETONE	480.96	21	METHYL ETHYL KETONE	430.08
27	CYCLOHEXANE	152.64	27	CYCLOHEXANE	0.00
31	n-HEPTANE	88.32	31	n-HEPTANE	120.00
33	BENZENE	16025.28	33	BENZENE	11876.16
35	METHYLCYCLOHEXANE	702.72	35	METHYLCYCLOHEXANE	202.56
42	TOLUENE	7536.96	42	TOLUENE	5771.52
51	n-NONANE	1365.12	51	n-NONANE	639.36
53	ETHYLBENZENE	2199.36	53	ETHYLBENZENE	2071.68
54	M,P-XYLENE	555.84	54	M,P-XYLENE	568.32
55	O-XYLENE	206.40	55	O-XYLENE	192.96
56	STYRENE	6240.00	56	STYRENE	6325.44
59	ISOPROPYLBENZENE	4992.00	59	ISOPROPYLBENZENE	589,44
61	n-DECANE	918.72	61	n-DECANE	1064.64
62	n-PROPYLBENZENE	559.68	62	n-PROPYLBENZENE	617.28
63	1,3,5-TRIMETHYLBENZENE	29.76	63	1,3,5-TRIMETHYLBENZENE	30.72
65	1,2,4-TRIMETHYLBENZENE	85.44	65	1,2,4-TRIMETHYLBENZENE	74.88
67	d-LIMONENE	1108.80	67	d-LIMONENE	935.04
68	p-ISOPROPYLTOLUENE	282.24	68	p-ISOPROPYLTOLUENE	132.48
70	1,2,3-TRIMETHYLBENZENE	212.16	70	1,2,3-TRIMETHYLBENZENE	187,20
72	n-UNDECANE	814.08	72	n-UNDECANE	698.88
75	n-DODECANE	141.12	75	n-DODECANE	101.76
78	Naphthalene	51.84	78	Naphthalene	32.64



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Target analyte results for the SynGas 50% Plastics Mix

SynGas_50% Plastics Mix

	Analyte	ppmV
2	Propene	40676.16
7	1,3-Butadiene	6714.24
12	ISOPRENE	17664.00
14	ACETONE	2304.00
15	n-HEXANE	158.40
21	METHYL ETHYL KETONE	260.16
27	CYCLOHEXANE	0.00
31	n-HEPTANE	107.52
33	BENZENE	16671.36
35	METHYLCYCLOHEXANE	284.16
42	TOLUENE	2063.04
51	n-NONANE	275.52
53	ETHYLBENZENE	148.80
54	M,P-XYLENE	157.44
55	O-XYLENE	49.92
56	STYRENE	165.12
59	ISOPROPYLBENZENE	52.80
61	n-DECANE	457.92
62	n-PROPYLBENZENE	131.52
63	1,3,5-TRIMETHYLBENZENE	11.52
65	1,2,4-TRIMETHYLBENZENE	29.76
67	d-LIMONENE	31.68
68	p-ISOPROPYLTOLUENE	45.12
70	1,2,3-TRIMETHYLBENZENE	82.56
72	n-UNDECANE	166.08
75	n-DODECANE	65.28
78	Naphthalene	21.12



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Target Analyte Results for the Diesel Exhaust Samples

Target Analyte Results for the Diesel Exhaust Long Term Mix

	SynGas_Exhaust_Long Term Mix 1			SynGas_Exhaust_Long Term Mix	
	Analyte	ppbV	4.3	Analyte	ppbV
2	Propene	4425.60	2	Propene	7214.40
7	1,3-Butadiene	<10.	7	1,3-Butadiene	<10.
12	ISOPRENE	<10.	12	ISOPRENE	<10.
14	ACETONE	993.60	14	ACETONE	1797.60
15	n-HEXANE	74.40	15	n-HEXANE	127.20
21	METHYL ETHYL KETONE	<10.	21	METHYL ETHYL KETONE	256.80
27	CYCLOHEXANE	<10.	27	CYCLOHEXANE	<10.
31	n-HEPTANE	<10.	31	n-HEPTANE	33.60
33	BENZENE	13166,40	33	BENZENE	14188.80
35	METHYLCYCLOHEXANE	57.60	35	METHYLCYCLOHEXANE	117.60
42	TOLUENE	856.80	42	TOLUENE	1207.20
51	n-NONANE	57,60	51	n-NONANE	542.40
53	ETHYLBENZENE	158.40	53	ETHYLBENZENE	386.40
54	M,P-XYLENE	86,40	54	M,P-XYLENE	220.80
55	O-XYLENE	33.60	55	O-XYLENE	91.20
56	STYRENE	427.20	56	STYRENE	244.80
59	ISOPROPYLBENZENE	103.20	59	ISOPROPYLBENZENE	184.80
61	n-DECANE	218.40	61	n-DECANE	556.80
62	n-PROPYLBENZENE	220.80	62	n-PROPYLBENZENE	278.40
63	1,3,5-TRIMETHYLBENZENE	26.40	63	1,3,5-TRIMETHYLBENZENE	28.80
65	1,2,4-TRIMETHYLBENZENE	40.80	65	1,2,4-TRIMETHYLBENZENE	57.60
67	d-LIMONENE	<10.	67	d-LIMONENE	<10.
68	p-ISOPROPYLTOLUENE	607.20	68	p-ISOPROPYLTOLUENE	103.20
70	1,2,3-TRIMETHYLBENZENE	292.80	70	1,2,3-TRIMETHYLBENZENE	180.00
72	n-UNDECANE	331.20	72	n-UNDECANE	403.20
75	n-DODECANE	115.20	75	n-DODECANE	112.80
78	Naphthalene	38.40	78	Naphthalene	38.40



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Target Analyte Results for the Diesel Exhaust 100% Construction Mix

	SynGas_Exhaust_100% Construction Mix 1			SynGas_Exhaust_100% Construction Mix 2	
	Analyte	ppbV		Analyte	ppbV
2	Propene	1716.00	2	Propene	6184.80
7	1,3-Butadiene	<10.	7	1,3-Butadiene	<10.
12	ISOPRENE	<10.	12	ISOPRENE	<10.
14	ACETONE	806.40	14	ACETONE	2479.20
15	n-HEXANE	38.40	15	n-HEXANE	36.00
21	METHYL ETHYL KETONE	146.40	21	METHYL ETHYL KETONE	290.40
27	CYCLOHEXANE	<10.	27	CYCLOHEXANE	<10.
31	n-HEPTANE	<10.	31	n-HEPTANE	26.40
33	BENZENE	2668.80	33	BENZENE	16514.40
35	METHYLCYCLOHEXANE	<10.	35	METHYLCYCLOHEXANE	110.40
42	TOLUENE	468.00	42	TOLUENE	1039.20
51	n-NONANE	163.20	51	n-NONANE	580.80
53	ETHYLBENZENE	148.80	53	ETHYLBENZENE	141.60
54	M,P-XYLENE	64.80	54	M,P-XYLENE	163.20
55	O-XYLENE	33.60	55	O-XYLENE	76.80
56	STYRENE	475.20	56	STYRENE	206.40
59	ISOPROPYLBENZENE	84.00	59	ISOPROPYLBENZENE	91.20
61	n-DECANE	177.60	61	n-DECANE	616.80
62	n-PROPYLBENZENE	139.20	62	n-PROPYLBENZENE	256.80
63	1,3,5-TRIMETHYLBENZENE	12.00	63	1,3,5-TRIMETHYLBENZENE	38.40
65	1,2,4-TRIMETHYLBENZENE	33.60	65	1,2,4-TRIMETHYLBENZENE	69.60
67	d-LIMONENE	<10.	67	d-LIMONENE	<10.
68	p-ISOPROPYLTOLUENE	50.40	68	p-ISOPROPYLTOLUENE	127.20
70	1,2,3-TRIMETHYLBENZENE	98.40	70	1,2,3-TRIMETHYLBENZENE	228.00
72	n-UNDECANE	105.60	72	n-UNDECANE	616.80
75	n-DODECANE	55.20	75	n-DODECANE	124.80
78	Naphthalene	45.60	78	Naphthalene	93.60



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Target Analyte Results for the Diesel Exhaust 50% Food Mix

	SynGas_Exhaust_50% Food Mix 1			SynGas_Exhaust_50% Food Mix 2		
	Analyte	ppbV		Analyte	ppbV	
2	Propene	5642.40	2	Propene	2155.20	
7	1,3-Butadiene	<10.	7	1,3-Butadiene	<10.	
12	ISOPRENE	<10.	12	ISOPRENE	<10.	
14	ACETONE	1641.60	14	ACETONE	415.20	
15	n-HEXANE	91.20	15	n-HEXANE	<10.	
21	METHYL ETHYL KETONE	141.60	21	METHYL ETHYL KETONE	<10.	
27	CYCLOHEXANE	<10.	27	CYCLOHEXANE	<10.	
31	n-HEPTANE	26.40	31	n-HEPTANE	7.20	
33	BENZENE	13024.80	33	BENZENE	4024.80	
35	METHYLCYCLOHEXANE	<10.	35	METHYLCYCLOHEXANE	<10.	
42	TOLUENE	837.60	42	TOLUENE	1070.40	
51	n-NONANE	105.60	51	n-NONANE	297.60	
53	ETHYLBENZENE	211.20	53	ETHYLBENZENE	1946.40	
54	M,P-XYLENE	146.40	54	M,P-XYLENE	580.80	
55	O-XYLENE	52.80	55	O-XYLENE	256.80	
56	STYRENE	429.60	56	STYRENE	8707.20	
59	ISOPROPYLBENZENE	93.60	59	ISOPROPYLBENZENE	1677.60	
61	n-DECANE	657.60	61	n-DECANE	2258.40	
62	n-PROPYLBENZENE	182.40	62	n-PROPYLBENZENE	1084.80	
63	1,3,5-TRIMETHYLBENZENE	21.60	63	1,3,5-TRIMETHYLBENZENE	81.60	
65	1,2,4-TRIMETHYLBENZENE	40.80	65	1,2,4-TRIMETHYLBENZENE	206.40	
67	d-LIMONENE	<10.	67	d-LIMONENE	9204.00	
68	p-ISOPROPYLTOLUENE	<10.	68	p-ISOPROPYLTOLUENE	2529.60	
70	1,2,3-TRIMETHYLBENZENE	127.20	70	1,2,3-TRIMETHYLBENZENE	777.60	
72	n-UNDECANE	729.60	72	n-UNDECANE	3026.40	
75	n-DODECANE	295.20	75	n-DODECANE	847.20	
78	Naphthalene	26.40	78	Naphthalene	376.80	



HOWARD A. ZUCKER, M.D., J.D. Commissioner

SALLY DRESLIN, M.S., R.N. Executive Deputy Commissioner

Target Analyte Results for the Diesel Exhaust 33% POL Mix

	SynGas_Exhaust_33% POL Mix 1			SynGas_Exhaust_33% POL Mix 2	
	Analyte	ppbV		Analyte	ppbV
2	Propene	16970.40	2	Propene	5380.80
7	1,3-Butadiene	<10.	7	1,3-Butadiene	<10.
12	ISOPRENE	<10.	12	ISOPRENE	<10.
14	ACETONE	5882.40	14	ACETONE	1137.60
15	n-HEXANE	81.60	15	n-HEXANE	12.00
21	METHYL ETHYL KETONE	751.20	21	METHYL ETHYL KETONE	103.20
27	CYCLOHEXANE	<10.	27	CYCLOHEXANE	<10.
31	n-HEPTANE	74.40	31	n-HEPTANE	12.00
33	BENZENE	24357.60	33	BENZENE	13812.00
35	METHYLCYCLOHEXANE	328.80	35	METHYLCYCLOHEXANE	<10.
42	TOLUENE	2978.40	42	TOLUENE	1108.80
51	n-NONANE	1620.00	51	n-NONANE	350.40
53	ETHYLBENZENE	518.40	53	ETHYLBENZENE	290.40
54	M,P-XYLENE	513.60	54	M,P-XYLENE	132.00
55	O-XYLENE	343.20	55	O-XYLENE	76.80
56	STYRENE	434.40	56	STYRENE	194.40
59	ISOPROPYLBENZENE	434.40	59	ISOPROPYLBENZENE	151.20
61	n-DECANE	3055.20	61	n-DECANE	508.80
62	n-PROPYLBENZENE	1192.80	62	n-PROPYLBENZENE	228.00
63	1,3,5-TRIMETHYLBENZENE	136.80	63	1,3,5-TRIMETHYLBENZENE	16.80
65	1,2,4-TRIMETHYLBENZENE	324.00	65	1,2,4-TRIMETHYLBENZENE	26.40
67	d-LIMONENE	<10.	67	d-LIMONENE	<10.
68	p-ISOPROPYLTOLUENE	60.00	68	p-ISOPROPYLTOLUENE	84.00
70	1,2,3-TRIMETHYLBENZENE	1094.40	70	1,2,3-TRIMETHYLBENZENE	134.40
72	n-UNDECANE	3806.40	72	n-UNDECANE	532.80
75	n-DODECANE	1454.40	75	n-DODECANE	170.40
78	Naphthalene	381.60	78	Naphthalene	38.40



HOWARD A. ZUCKER, M.D., J.D. Commissioner

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Target Analyte Results for the Diesel Exhaust 40% Tire Mix

		SynGas_Exhaust_40% Tire Mix 1		SynGas_Exhaust_40% Tire Mix 2	
	Analyte	ppbV		Analyte	ppbV
2	Propene	7576.80	2	Propene	3837.60
7	1,3-Butadiene	<10.	7	1,3-Butadiene	<10.
12	ISOPRENE	<10.	12	ISOPRENE	<10.
14	ACETONE	2006.40	14	ACETONE	1221.60
15	n-HEXANE	151.20	15	n-HEXANE	67.20
21	METHYL ETHYL KETONE	175.20	21	METHYL ETHYL KETONE	60.00
27	CYCLOHEXANE	0.00	27	CYCLOHEXANE	<10.
31	n-HEPTANE	19.20	31	n-HEPTANE	<10.
33	BENZENE	16910.40	33	BENZENE	10231.20
35	METHYLCYCLOHEXANE	146.40	35	METHYLCYCLOHEXANE	<10.
42	TOLUENE	2356.80	42	TOLUENE	1156.80
51	n-NONANE	501.60	51	n-NONANE	249.60
53	ETHYLBENZENE	631.20	53	ETHYLBENZENE	345.60
54	M,P-XYLENE	218.40	54	M,P-XYLENE	110.40
55	O-XYLENE	108.00	55	O-XYLENE	50.40
56	STYRENE	595.20	56	STYRENE	139.20
59	ISOPROPYLBENZENE	223.20	59	ISOPROPYLBENZENE	148.80
61	n-DECANE	717.60	61	n-DECANE	199.20
62	n-PROPYLBENZENE	304.80	62	n-PROPYLBENZENE	122.40
63	1,3,5-TRIMETHYLBENZENE	28.80	63	1,3,5-TRIMETHYLBENZENE	<10.
65	1,2,4-TRIMETHYLBENZENE	81.60	65	1,2,4-TRIMETHYLBENZENE	16.80
67	d-LIMONENE	<10.	67	d-LIMONENE	22154.40
68	p-ISOPROPYLTOLUENE	141.60	68	p-ISOPROPYLTOLUENE	26,40
70	1,2,3-TRIMETHYLBENZENE	252.00	70	1,2,3-TRIMETHYLBENZENE	62,40
72	n-UNDECANE	633.60	72	n-UNDECANE	<10.
75	n-DODECANE	122.40	75	n-DODECANE	<10.
78	Naphthalene	55.20	78	Naphthalene	14.40



HOWARD A. ZUCKER, M.D., J.D. Commissioner

SALLY DRESLIN, M.S., R.N. Executive Deputy Commissioner

Target Analyte Results for the Diesel Exhaust 50% Plastics Mix

SynGas_Exhaust_50% Plastics Mix

	Analyte	ppbV
2	Propene	6393.60
7	1,3-Butadiene	<10.
12	ISOPRENE	<10.
14	ACETONE	1034.40
15	n-HEXANE	124.80
21	METHYL ETHYL KETONE	84.00
27	CYCLOHEXANE	12.00
31	n-HEPTANE	33.60
33	BENZENE	12938.40
35	METHYLCYCLOHEXANE	<10.
42	TOLUENE	828.00
51	n-NONANE	276.00
53	ETHYLBENZENE	182.40
54	M,P-XYLENE	76.80
55	O-XYLENE	28.80
56	STYRENE	458.40
59	ISOPROPYLBENZENE	76.80
61	n-DECANE	292.80
62	n-PROPYLBENZENE	98.40
63	1,3,5-TRIMETHYLBENZENE	9.60
65	1,2,4-TRIMETHYLBENZENE	21.60
67	d-LIMONENE	<10.
68	p-ISOPROPYLTOLUENE	<10.
70	1,2,3-TRIMETHYLBENZENE	64.80
72	n-UNDECANE	338.40
75	n-DODECANE	105.60

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HOWARD A. ZUCKER, M.D., J.D. Commissioner

SALLY DRESLIN, M.S., R.N. Executive Deputy Commissioner

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78 Naphthalene

12.00

Two commercial diesel fuel samples were run through the 60kW diesel engine collecting the exhaust for use as a reference to the Syngas exhaust samples. Target analyte results listed below:

Target Analyte Results for the Diesel Fuel Exhaust Reference

	SynGas_Diesel_Exhaust_Ref_1			SynGas_Diesel_Exhaust_Re	f_2
	Analyte	ppbV		Analyte	ppbV
2	Propene	<10.	2	Propene	<10.
7	1,3-Butadiene	<10,	7	1,3-Butadiene	<10.
9	ISOPRENE	<10.	9	ISOPRENE	<10.
11	ACETONE	<10.	11	ACETONE	<10.
15	n-HEXANE	<10.	15	n-HEXANE	<10.
18	METHYL ETHYL KETONE	<10.	18	METHYL ETHYL KETONE	<10.
23	CYCLOHEXANE	<10,	23	CYCLOHEXANE	<10.
27	n-HEPTANE	<10.	27	n-HEPTANE	<10.
29	BENZENE	202.28	29	BENZENE	194.56
31	METHYLCYCLOHEXANE	29.08	31	METHYLCYCLOHEXANE	21.88
37	TOLUENE	89.29	37	TOLUENE	68.76
45	n-NONANE	134.92	45	n-NONANE	89.52
47	ETHYLBENZENE	<10.	47	ETHYLBENZENE	32.12
48	M,P-XYLENE	44.92	48	M,P-XYLENE	<10.
49	O-XYLENE	24.84	49	O-XYLENE	<10.
50	STYRENE	<10.	50	STYRENE	56.48
52	ISOPROPYLBENZENE	<10.	52	ISOPROPYLBENZENE	20.36
54	n-DECANE	214.04	54	n-DECANE	123.48
55	n-PROPYLBENZENE	61.28	55	n-PROPYLBENZENE	45.84
56	1,3,5-TRIMETHYLBENZENE	<10.	56	1,3,5-TRIMETHYLBENZENE	<10.
58	1,2,4-TRIMETHYLBENZENE	23.56	58	1,2,4-TRIMETHYLBENZENE	<10.



Governo	W M. CUOMO	HOWARD A. ZU Commissioner	ICKE	A STATE OF THE PARTY OF THE PAR	LLY DRESLIN, M.S., R.N. ecutive Deputy Commissioner
60	d-LIMONENE	<10.	60	d-LIMONENE	<10.
61	p-ISOPROPYLTOLUENE	<10.	61	p-ISOPROPYLTOLUE	NE <10.
63	1,2,3-TRIMETHYLBENZENE	72.92	63	1,2,3-TRIMETHYLBE	NZENE 28.76
65	n-UNDECANE	361.64	65	n-UNDECANE	191.32
68	n-DODECANE	252.84	68	n-DODECANE	135.52
78	Naphthalene	38.36	78	Naphthalene	22.76

Target Analyte Response as a Percentage of the Total Sample Response

Target analyte % results for the SynGas Long Term Mix

SynGas_Long Term Mix 1	0/ -6	SynGas_Long Term Mix 2	0/ -5
Analyte	% of T	Analyte	% of T
Propene	7.91	Propene	5.67
1,3-Butadiene	3.17	1,3-Butadiene	1.75
ISOPRENE	0.43	ISOPRENE	0.26
ACETONE	1.14	ACETONE	1.53
n-HEXANE	5.11	n-HEXANE	4.58
METHYL ETHYL KETONE	2.07	METHYL ETHYL KETONE	0.79
CYCLOHEXANE	0.21	CYCLOHEXANE	0.09
n-HEPTANE	2.11	n-HEPTANE	1.99
BENZENE	7.81	BENZENE	7.59
METHYLCYCLOHEXANE	0.39	METHYLCYCLOHEXANE	0.34
TOLUENE	3.14	TOLUENE	3.66
n-NONANE	0.71	n-NONANE	1.32
ETHYLBENZENE	0.56	ETHYLBENZENE	2.31
M,P-XYLENE	1.13	M,P-XYLENE	2.14
O-XYLENE	0.29	O-XYLENE	1.46
STYRENE	0.72	STYRENE	4.83
ISOPROPYLBENZENE	0.03	ISOPROPYLBENZENE	0.25
n-DECANE	0.46	n-DECANE	1.05
n-PROPYLBENZENE	0.04	n-PROPYLBENZENE	0.71
1,3,5-TRIMETHYLBENZENE	0.09	1,3,5-TRIMETHYLBENZENE	0.19
1,2,4-TRIMETHYLBENZENE	0.29	1,2,4-TRIMETHYLBENZENE	0.61
d-LIMONENE	0.02	d-LIMONENE	0.68

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SynGas_100% Construction Mix

ANDREW M. CUOMO Governor	HOWARD A. Z Commissioner	The state of the s	SALLY DRESLIN, M.S., R.N. Executive Deputy Commissioner
p-ISOPROPYLTOLUENE	0.07	p-ISOPROPYLTOLUENE	0.31
1,2,3-TRIMETHYLBENZENE	0.02	1,2,3-TRIMETHYLBENZE	NE 0.26
n-UNDECANE	0.06	n-UNDECANE	0.67
n-DODECANE	0.02	n-DODECANE	0.31
Naphthalene	0.03	Naphthalene	0.12
Total of Chromatogram	38.03	Total %	45.47

Target analyte % results for the SynGas 100% Construction Mix

SynGas_100% Construction Mix

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SynGas Target Analyte Percent of Total Response (100% Construction Mix)

	% of		% of
Analyte	T	Analyte	т
Propene	6.77	Propene	4.52
1,3-Butadiene	1.84	1,3-Butadiene	1.18
ISOPRENE	0.32	ISOPRENE	0.14
ACETONE	1.91	ACETONE	1.84
n-HEXANE	3.52	n-HEXANE	2.54
METHYL ETHYL KETONE	0.91	METHYL ETHYL KETONE	0.86
CYCLOHEXANE	0.00	CYCLOHEXANE	0.07
n-HEPTANE	1.97	n-HEPTANE	1.38
BENZENE	6.78	BENZENE	6.84
METHYLCYCLOHEXANE	1.11	METHYLCYCLOHEXANE	0.32
TOLUENE	3.21	TOLUENE	4.04
n-NONANE	1.54	n-NONANE	2.01
ETHYLBENZENE	1.49	ETHYLBENZENE	3.15
M,P-XYLENE	1.96	M,P-XYLENE	2.71
O-XYLENE	0.98	O-XYLENE	1.34
STYRENE	3.17	STYRENE	5.37
ISOPROPYLBENZENE	0.18	ISOPROPYLBENZENE	0.31



ANDREW M. CUOMO Governor	HOWARD A. Commissione	ZUCKER, M.D., J.D.	SALLY DRESLIN, M.S., R.N. Executive Deputy Commissioner
n-DECANE	1.73	n-DECANE	1.94
n-PROPYLBENZENE	0.67	n-PROPYLBENZENE	0.68
1,3,5-TRIMETHYLBENZENE	0.45	1,3,5-TRIMETHYLBENZE	NE 0.39
1,2,4-TRIMETHYLBENZENE	1.48	1,2,4-TRIMETHYLBENZE	NE 1.12
d-LIMONENE	0.52	d-LIMONENE	0.81
p-ISOPROPYLTOLUENE	0.25	p-ISOPROPYLTOLUENE	0.43
1,2,3-TRIMETHYLBENZENE	0.28	1,2,3-TRIMETHYLBENZE	NE 0.48
n-UNDECANE	0.93	n-UNDECANE	1.37
n-DODECANE	0.28	n-DODECANE	0.42
Naphthalene	0.09	Naphthalene	0.27
Total of Chromatogram	44.34	Total %	46.53

Target analyte % results for the SynGas 50% Food Mix

SynGas_50% Food Mix 1		SynGas_50% Food Mix 2	
Analyte	% of T	Analyte	% of
Propene	5.63	Propene	6.72
1,3-Butadiene	2.43	1,3-Butadiene	2.92
ISOPRENE	0.22	ISOPRENE	0.36
ACETONE	1.21	ACETONE	1.21
n-HEXANE	2.69	n-HEXANE	3.38
METHYL ETHYL KETONE	2.25	METHYL ETHYL KETONE	1.26
CYCLOHEXANE	0.15	CYCLOHEXANE	0.19
n-HEPTANE	1.56	n-HEPTANE	2.22
BENZENE	8.18	BENZENE	6.59
METHYLCYCLOHEXANE	0.91	METHYLCYCLOHEXANE	0.27
TOLUENE	3.55	TOLUENE	3.04
n-NONANE	1.73	n-NONANE	1.01
ETHYLBENZENE	1.55	ETHYLBENZENE	2.73
M,P-XYLENE	2.18	M,P-XYLENE	1.81
O-XYLENE	1.22	O-XYLENE	2.08
STYRENE	3.08	STYRENE	4.85
ISOPROPYLBENZENE	0.18	ISOPROPYLBENZENE	0.46
n-DECANE	1.46	n-DECANE	1.05
n-PROPYLBENZENE	0.44	n-PROPYLBENZENE	0.77

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ANDREW M. CUOMO Governor	HOWARD A. Z Commissioner		SALLY DRESLIN, M.S., R.N. Executive Deputy Commissioner
1,3,5-TRIMETHYLBENZENE	0.26	1,3,5-TRIMETHYLBENZE	NE 0.71
1,2,4-TRIMETHYLBENZENE	0.76	1,2,4-TRIMETHYLBENZE	
d-LIMONENE	0.53	d-LIMONENE	1.22
p-ISOPROPYLTOLUENE	0.32	p-ISOPROPYLTOLUENE	0.28
1,2,3-TRIMETHYLBENZENE	0.31	1,2,3-TRIMETHYLBENZE	NE 0.22
n-UNDECANE	0.88	n-UNDECANE	0.52
n-DODECANE	0.29	n-DODECANE	0.21
Naphthalene	0.08	Naphthalene	0.08
Total of Chromatogram	44.05	Total %	46.55

Target analyte % results for the SynGas 33% POL Mix

SynGas_33% POL Mix 1		SynGas_33% POL Mix 2		
	% of		% of	
Analyte		Analyte	Т	
Propene	5.11	Propene	5.73	
1,3-Butadiene	2.12	1,3-Butadiene	3.07	
ISOPRENE	3.99	ISOPRENE	0.33	
ACETONE	1.47	ACETONE	1.04	
n-HEXANE	1.45	n-HEXANE	2.58	
METHYL ETHYL KETONE	1.19	METHYL ETHYL KETONE	1.08	
CYCLOHEXANE	0.21	CYCLOHEXANE	0.29	
n-HEPTANE	1.08	n-HEPTANE	2.16	
BENZENE	5.86	BENZENE	7.08	
METHYLCYCLOHEXANE	1.05	METHYLCYCLOHEXANE	0.41	
TOLUENE	3.07	TOLUENE	3.09	
n-NONANE	1.34	n-NONANE	1.04	
ETHYLBENZENE	2.12	ETHYLBENZENE	1.63	
M,P-XYLENE	2.16	M,P-XYLENE	1.41	
O-XYLENE	1.24	O-XYLENE	1.46	
STYRENE	3.69	STYRENE	3.35	
ISOPROPYLBENZENE	0.27	ISOPROPYLBENZENE	0.24	

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ANDREW M. CUOMO Governor	HOWARD A. Commissione		SALLY DRESLIN, M.S., R.N. Executive Deputy Commissioner
n-DECANE	1.58	n-DECANE	0.88
n-PROPYLBENZENE	0.69	n-PROPYLBENZENE	0.58
1,3,5-TRIMETHYLBENZENE	0.39	1,3,5-TRIMETHYLBENZE	NE 0.56
1,2,4-TRIMETHYLBENZENE	1.08	1,2,4-TRIMETHYLBENZE	NE 0.31
d-LIMONENE	0.92	d-LIMONENE	0.85
p-ISOPROPYLTOLUENE	0.29	p-ISOPROPYLTOLUENE	0.21
1,2,3-TRIMETHYLBENZENE	0.41	1,2,3-TRIMETHYLBENZE	NE 0.18
n-UNDECANE	0.99	n-UNDECANE	0.52
n-DODECANE	0.49	n-DODECANE	0.18
Naphthalene	0.21	Naphthalene	0.09
Total of Chromatogram	44.47	Total %	40.35

Target analyte % results for the SynGas 40% Tire Mix

SynGas_40% Tire Mix 1 % of		SynGas_40% Tire Mix 2	% of
Analyte	Т_	Analyte	
Propene	4.37	Propene	3.95
1,3-Butadiene	2.78	1,3-Butadiene	2.51
ISOPRENE	4.83	ISOPRENE	0.18
ACETONE	0.92	ACETONE	1.11
n-HEXANE	2.26	n-HEXANE	1.71
METHYL ETHYL KETONE	0.39	METHYL ETHYL KETONE	0.82
CYCLOHEXANE	0.29	CYCLOHEXANE	0.33
n-HEPTANE	1.77	n-HEPTANE	1.31
BENZENE	7.07	BENZENE	6.53
METHYLCYCLOHEXANE	0.49	METHYLCYCLOHEXANE	0.46
TOLUENE	3.67	TOLUENE	3.51
n-NONANE	0.96	n-NONANE	1.07
ETHYLBENZENE	2.48	ETHYLBENZENE	2.94
M,P-XYLENE	1.78	M,P-XYLENE	1.93
O-XYLENE	1.29	O-XYLENE	2.34

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ANDREW M. CUOMO Governor	HOWARD A. Commissione		SALLY DRESLIN, M.S., R.N. Executive Deputy Commissioner
STYRENE	4.41	STYRENE	4.51
ISOPROPYLBENZENE	0.27	ISOPROPYLBENZENE	0.37
n-DECANE	0.84	n-DECANE	1.01
n-PROPYLBENZENE	0.73	n-PROPYLBENZENE	0.76
1,3,5-TRIMETHYLBENZENE	0.17	1,3,5-TRIMETHYLBENZE	NE 0.17
1,2,4-TRIMETHYLBENZENE	0.49	1,2,4-TRIMETHYLBENZE	NE 0.41
d-LIMONENE	0.68	d-LIMONENE	0.61
p-ISOPROPYLTOLUENE	0.68	p-ISOPROPYLTOLUENE	0.63
1,2,3-TRIMETHYLBENZENE	0.21	1,2,3-TRIMETHYLBENZE	NE 0.18
n-UNDECANE	0.51	n-UNDECANE	0.45
n-DODECANE	0.25	n-DODECANE	0.17
Naphthalene	0.11	Naphthalene	0.06
Total %	44.70	Total %	40.03

Target analyte % results for the SynGas 50% Plastics Mix

SynGas_50% Plastics Mix

Analyte	% of T
Propene	9.48
1,3-Butadiene	4.39
ISOPRENE	0.49
ACETONE	0.76
n-HEXANE	5.15
METHYL ETHYL KETONE	0.55
CYCLOHEXANE	0.21
n-HEPTANE	1.82
BENZENE	8.84
METHYLCYCLOHEXANE	0.31
TOLUENE	6.50
n-NONANE	0.57
ETHYLBENZENE	0.52

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HOWARD A. ZUCKER, M.D., J.D. Commissioner M,P-XYLENE 0.98 O-XYLENE 0.31 STYRENE 1.01 **ISOPROPYLBENZENE** 0.04 n-DECANE 0.41 n-PROPYLBENZENE 0.12 0.09 1,3,5-TRIMETHYLBENZENE 0.26 1,2,4-TRIMETHYLBENZENE 0.06 d-LIMONENE 0.05 p-ISOPROPYLTOLUENE 1,2,3-TRIMETHYLBENZENE 0.08 n-UNDECANE 0.22 n-DODECANE 0.06 Naphthalene 0.02 **Total of Chromatogram** 43.30 SALLY DRESLIN, M.S., R.N. Executive Deputy Commissioner

Target Analyte Response as a Percentage of the Total Sample Response

Target Analyte % Results for the Diesel Exhaust Long Term Mix

Exhaust_Long Term Mix 1		Exhaust_Long Term Mix 2	
ACLINE.	% of	Access	% of
Analyte	T	Analyte	
Propene	10.93	Propene	16.01
1,3-Butadiene	0.00	1,3-Butadiene	0.00
ISOPRENE	0.00	ISOPRENE	0.00
ACETONE	1.39	ACETONE	1.89
n-HEXANE	0.91	n-HEXANE	1.59
METHYL ETHYL KETONE	0.00	METHYL ETHYL KETONE	0.42
CYCLOHEXANE	0.00	CYCLOHEXANE	0.00
n-HEPTANE	0.26	n-HEPTANE	0.67
BENZENE	38.83	BENZENE	32.79
METHYLCYCLOHEXANE	0.00	METHYLCYCLOHEXANE	0.17
TOLUENE	3.42	TOLUENE	0.35

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ANDREW M. CUOMO Governor	HOWARD A. Commissione	ZUCKER, M.D., J.D.	SALLY DRESLIN, M.S., R.N. Executive Deputy Commissioner
n-NONANE	0.26	n-NONANE	0.58
ETHYLBENZENE	1.15	ETHYLBENZENE	2.52
M,P-XYLENE	0.77	M,P-XYLENE	1.59
O-XYLENE	0.21	O-XYLENE	0.89
STYRENE	2.11	STYRENE	1.48
ISOPROPYLBENZENE	0.08	ISOPROPYLBENZENE	0.14
n-DECANE	0.41	n-DECANE	0.74
n-PROPYLBENZENE	0.31	n-PROPYLBENZENE	0.24
1,3,5-TRIMETHYLBENZENE	0.14	1,3,5-TRIMETHYLBENZE	NE 0.15
1,2,4-TRIMETHYLBENZENE	0.31	1,2,4-TRIMETHYLBENZE	NE 0.48
d-LIMONENE	0.00	d-LIMONENE	0.00
p-ISOPROPYLTOLUENE	0.29	p-ISOPROPYLTOLUENE	0.11
1,2,3-TRIMETHYLBENZENE	0.02	1,2,3-TRIMETHYLBENZE	NE 0.15
n-UNDECANE	0.37	n-UNDECANE	0.52
n-DODECANE	0.19	n-DODECANE	0.12
Naphthalene	0.18	Naphthalene	0.17
Total of Chromatogram	62.54	Total %	63.77

Target Analyte % Results for the Diesel Exhaust 100% Construction Mix

Exhaust_100% Construction Mix 1		Exhaust_100% Construction Mix 2		
	Analyte	% of T	Analyte	% of T
	Propene	27.56	Propene	7.91
	1,3-Butadiene	0.00	1,3-Butadiene	0.00
	ISOPRENE	0.00	ISOPRENE	0.00
	ACETONE	1.48	ACETONE	2.47
	n-HEXANE	0.81	n-HEXANE	1.14
	METHYL ETHYL KETONE	0.28	METHYL ETHYL KETONE	0.31
	CYCLOHEXANE	0.00	CYCLOHEXANE	0.07
	n-HEPTANE	0.00	n-HEPTANE	0.59

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ANDREW M. CUOMO Governor	HOWARD A. Commissione	ZUCKER, M.D., J.D.	SALLY DRESLIN, M.S., R.N. Executive Deputy Commissioner
BENZENE	10.64	BENZENE	32.88
METHYLCYCLOHEXANE	0.00	METHYLCYCLOHEXANE	0.17
TOLUENE	3.01	TOLUENE	3.14
n-NONANE	0.38	n-NONANE	0.65
ETHYLBENZENE	1.37	ETHYLBENZENE	1.02
M,P-XYLENE	0.94	M,P-XYLENE	1.18
O-XYLENE	0.81	O-XYLENE	0.46
STYRENE	3.47	STYRENE	1.36
ISOPROPYLBENZENE	0.18	ISOPROPYLBENZENE	0.08
n-DECANE	0.85	n-DECANE	0.21
n-PROPYLBENZENE	0.31	n-PROPYLBENZENE	0.25
1,3,5-TRIMETHYLBENZENE	0.17	1,3,5-TRIMETHYLBENZE	ENE 0.26
1,2,4-TRIMETHYLBENZENE	0.32	1,2,4-TRIMETHYLBENZE	ENE 0.55
d-LIMONENE	0.00	d-LIMONENE	0.00
p-ISOPROPYLTOLUENE	0.06	p-ISOPROPYLTOLUENE	0.08
1,2,3-TRIMETHYLBENZENE	0.12	1,2,3-TRIMETHYLBENZE	ENE 0.11
n-UNDECANE	0.24	n-UNDECANE	0.58
n-DODECANE	0.18	n-DODECANE	0.16
Naphthalene	0.36	Naphthalene	0.38
Total of Chromatogram	53.54	Total %	56.01

Target Analyte % Results for the Diesel Exhaust 50% Food Mix

Exhaust 50% Food Mix 1		Exhaust 50% Food Mix 2	
ALLIA	% of	A	% of
Analyte	101	_Analyte	
Propene	15.69	Propene	1.05
1,3-Butadiene	0.00	1,3-Butadiene	0.00
ISOPRENE	0.00	ISOPRENE	0.00
ACETONE	1.62	ACETONE	0.23
n-HEXANE	0.91	n-HEXANE	0.26
METHYL ETHYL KETONE	0.06	METHYL ETHYL KETONE	0.00
CYCLOHEXANE	0.00	CYCLOHEXANE	0.00
n-HEPTANE	0.41	n-HEPTANE	0.18

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ANDREW M. CUOMO Governor	HOWARD A. Commissione		SALLY DRESLIN, M.S., R.N. Executive Deputy Commissioner
BENZENE	26.32	BENZENE	5.56
METHYLCYCLOHEXANE	0.00	METHYLCYCLOHEXANE	0.00
TOLUENE	2.51	TOLUENE	2.26
n-NONANE	0.68	n-NONANE	1.22
ETHYLBENZENE	1.77	ETHYLBENZENE	5.21
M,P-XYLENE	1.11	M,P-XYLENE	2.64
O-XYLENE	0.11	O-XYLENE	0.11
STYRENE	1.92	STYRENE	21.05
ISOPROPYLBENZENE	0.09	ISOPROPYLBENZENE	0.71
n-DECANE	1.01	n-DECANE	3.12
n-PROPYLBENZENE	0.22	n-PROPYLBENZENE	0.75
1,3,5-TRIMETHYLBENZENE	0.07	1,3,5-TRIMETHYLBENZE	NE 0.41
1,2,4-TRIMETHYLBENZENE	0.36	1,2,4-TRIMETHYLBENZE	NE 1.26
d-LIMONENE	0.00	d-LIMONENE	5.01
p-ISOPROPYLTOLUENE	0.00	p-ISOPROPYLTOLUENE	1.14
1,2,3-TRIMETHYLBENZENE	0.09	1,2,3-TRIMETHYLBENZE	NE 0.87
n-UNDECANE	0.62	n-UNDECANE	2.54
n-DODECANE	0.58	n-DODECANE	1.05
Naphthalene	0.11	Naphthalene	1.12
Total of Chromatogram	56.26	Total %	57.75

Target Analyte % Results for the Diesel Exhaust 33% POL Mix

Exhaust_33% POL Mix 1		Exhaust 33% POL Mix 2	
	% of		% of
Analyte	T	Analyte	T_
Propene	12.06	Propene	11.89
1,3-Butadiene	0.00	1,3-Butadiene	0.00
ISOPRENE	0.00	ISOPRENE	0.00
ACETONE	2.74	ACETONE	1.51
n-HEXANE	0.24	n-HEXANE	0.82
METHYL ETHYL KETONE	0.41	METHYL ETHYL KETONE	0.19

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ANDREW M. CUOMO Governor	HOWARD A. Commissione	ZUCKER, M.D., J.D.	SALLY DRESLIN, M.S., R.N. Executive Deputy Commissioner
CYCLOHEXANE	0.00	CYCLOHEXANE	0.00
n-HEPTANE	0.59	n-HEPTANE	0.43
BENZENE	26.00	BENZENE	36.59
METHYLCYCLOHEXANE	18.00	METHYLCYCLOHEXANE	0.00
TOLUENE	3.75	TOLUENE	4.17
n-NONANE	0.72	n-NONANE	0.42
ETHYLBENZENE	1.72	ETHYLBENZENE	2.25
M,P-XYLENE	1.36	M,P-XYLENE	1.17
O-XYLENE	1.24	O-XYLENE	0.36
STYRENE	1.94	STYRENE	1.24
ISOPROPYLBENZENE	0.15	ISOPROPYLBENZENE	0.14
n-DECANE	1.61	n-DECANE	1.09
n-PROPYLBENZENE	0.39	n-PROPYLBENZENE	0.29
1,3,5-TRIMETHYLBENZENE	0.34	1,3,5-TRIMETHYLBENZE	NE 0.41
1,2,4-TRIMETHYLBENZENE	1.21	1,2,4-TRIMETHYLBENZE	NE 0.16
d-LIMONENE	0.00	d-LIMONENE	0.00
p-ISOPROPYLTOLUENE	0.18	p-ISOPROPYLTOLUENE	0.15
1,2,3-TRIMETHYLBENZENE	0.44	1,2,3-TRIMETHYLBENZE	NE 0.09
n-UNDECANE	1.91	n-UNDECANE	0.55
n-DODECANE	0.64	n-DODECANE	0.28
Naphthalene	0.75	Naphthalene	0.21
Total of Chromatogram	78.39	Total %	64.41

Target Analyte % Results for the Diesel Exhaust 40% Tire Mix

Exhaust_40% Tire Mix 1		Exhaust_40% Tire Mix 2	
Analyte	% of T	Analyte	% of T
Propene	11.91	Propene	5.95
1,3-Butadiene	0.00	1,3-Butadiene	0.00
ISOPRENE	0.00	ISOPRENE	0.00
ACETONE	1.81	ACETONE	1.93

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ANDREW M. CUOMO Governor	HOWARD A. Commissione	ZUCKER, M.D., J.D.	SALLY DRESLIN, M.S., R.N. Executive Deputy Commissioner
n-HEXANE	0.87	n-HEXANE	0.91
METHYL ETHYL KETONE	0.16	METHYL ETHYL KETON	IE 0.16
CYCLOHEXANE	0.00	CYCLOHEXANE	0.00
n-HEPTANE	0.55	n-HEPTANE	0.52
BENZENE	36.68	BENZENE	33.21
METHYLCYCLOHEXANE	0.11	METHYLCYCLOHEXANE	0.00
TOLUENE	5.77	TOLUENE	5.33
n-NONANE	0.12	n-NONANE	0.38
ETHYLBENZENE	2.11	ETHYLBENZENE	2.11
M,P-XYLENE	1.31	M,P-XYLENE	1.09
O-XYLENE	0.11	O-XYLENE	0.29
STYRENE	2.37	STYRENE	0.97
ISOPROPYLBENZENE	0.14	ISOPROPYLBENZENE	0.17
n-DECANE	0.74	n-DECANE	0.84
n-PROPYLBENZENE	0.31	n-PROPYLBENZENE	0.15
1,3,5-TRIMETHYLBENZENE	0.12	1,3,5-TRIMETHYLBENZ	ENE 0.33
1,2,4-TRIMETHYLBENZENE	0.53	1,2,4-TRIMETHYLBENZ	ENE 0.34
d-LIMONENE	0.00	d-LIMONENE	0.00
p-ISOPROPYLTOLUENE	0.09	p-ISOPROPYLTOLUENE	0.26
1,2,3-TRIMETHYLBENZENE	0.21	1,2,3-TRIMETHYLBENZ	ENE 0.11
n-UNDECANE	0.66	n-UNDECANE	0.19
n-DODECANE	0.09	n-DODECANE	0.09
Naphthalene	0.21	Naphthalene	0.09
Total %	66.98	Total %	55.42

Target Analyte % Results for the Diesel 50% Plastics Mix

Exhaust_50% Plastics Mix

Analyte	% of T
Propene	11.39
1,3-Butadiene	0.00

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HOWARD A. ZUCKER, Commissioner	M.D., J.D.	SALLY DRESLIN, M.S., R.N. Executive Deputy Commissioner
ISOPRENE	0.00	200000000000000000000000000000000000000
ACETONE	1.29	
n-HEXANE	1.44	
METHYL ETHYL KETONE	0.11	
CYCLOHEXANE	0.00	
n-HEPTANE	0.69	
BENZENE	43.24	
METHYLCYCLOHEXANE	0.00	
TOLUENE	2.91	
n-NONANE	0.42	
ETHYLBENZENE	1.31	
M,P-XYLENE	0.63	
O-XYLENE	0.18	
STYRENE	2.11	
ISOPROPYLBENZENE	0.00	
n-DECANE	0.42	
n-PROPYLBENZENE	0.15	
1,3,5-TRIMETHYLBENZENE	0.14	
1,2,4-TRIMETHYLBENZENE	0.15	
d-LIMONENE	0.06	
p-ISOPROPYLTOLUENE	0.05	
1,2,3-TRIMETHYLBENZENE	0.08	
n-UNDECANE	0.14	
n-DODECANE	0.18	
Naphthalene	0.36	
Total of Chromatogram	67.45	
Personal action of the world	4.00.52	

The percentages of total hydrocarbons as carbon atom units (C₃, C₄, etc) were calculated based on mass and retention time. The results are as follows:

SynGas Total Response as % Carbon Atom units

C_Units	SynGas_Long Term Mix 1	C_Units	SynGas_Long Term Mix 2
C3	10.42	C3	6.37
C4	12.79	C4	8.74
C5	21.64	C5	13.05
			32



ANDREW M. Governor	сиомо	HOWARD A. ZU Commissioner	JCKER, M.I	D., J.D. SALLY DRESLIN, M.S., R.N. Executive Deputy Commissione
C6		28.50	C6	21.45
C7		7.88	C7	8.16
C8		13.31	C8	13.91
C9		4.35	C9	15.67
C10		0.89	C10	7.49
C11		0.17	C11	3.42
C12		0.04	C12	1.38
C_Units	SynGas_100% Cons	truction Mix 1	C_Units	SynGas_100% Construction Mix 2
C3		8.01	C3	5.25
C4		8.66	C4	5.06
C5		12.25	C5	8.74
C6		19.54	C6	16.98
C7		6.59	C7	6.80
C8		15.03	C8	16.37
C9		12.33	C9	19.22
C10		11.29	C10	12.71
C11		4.76	C11	6.77
C12		1.25	C12	2.12
C_Units	SynGas_50% Fo	ood Mix 1	C_Units	SynGas_50% Food Mix 2
C3		6.62	C3	8.60
C4		9.38	C4	11.42
C5		11.30	C5	15.29
C6		22.75	C6	18.92
C7		6.56	C7	7.46
C8		16.23	C8	11.43
C9		12.95	C9	15.66
C10		8.73	C10	7.92
C11		4.29	C11	2.54
C12		1.20	C12	0.78

SynGas Total Response as % Carbon Atom units

C_Units	SynGas_33% POL Mix 1	C_Units	SynGas_33% POL Mix 2
C3	6.29	C3	7.51
C4	10.10	C4	11.29
C5	14.34	C5	16.87

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ANDREW M. CUOMO Governor	HOWARD A. ZU Commissioner	JCKER, M.D., J.D.	SALLY DRESLIN, M.S., R.N. Executive Deputy Commissioner
C6	16.90	C6	22,72
C7	7.37	C7	9.58
C8	12.65	C8	11.21
C9	14.21	C9	11,17
C10	10.78	C10	5.95
C11	5.27	C11	2.27
C12	2.17	C12	0.71
C_Units SynGas_40% T	ire Mix 1	C_Units	SynGas_40% Tire Mix 2
C3	5.00	C3	4.97
C4	9.65	C4	10.60
C5	16.04	C5	16.78
C6	21.36	C6	19.52
C7	10.92	C7	9.91
C8	12.52	C8	12.72
C9	14.67	C9	16.45
C10	6.13	C10	6.24
C11	2.64	C11	2.17
C12	1.07	C12	0.65
C_Units SynGas_50% Pla	astics Mix		
C3	12.10		
C4	14.16		
C5	22.49		
C6	27.14		
C7	6.57		
C8	9.48		
C9	3.99		
C10	2.62		
C11	0.99		
C12	0.16		

SynGas Exhaust Total Response as % Carbon Atom units

C_Units	Exhaust_Long Term Mix 1	C_Units	Exhaust_Long Term Mix 2
C3	12.10	C3	16.77



ANDREW M. C	UOMO HOWARD A		KER, M.D	D., J.D. SALLY DRESLIN, M.S., R.N. Executive Deputy Commissioner
C4	6.	07	C4	2.68
C5	9.	43	C5	10.92
C6	40.	68	C6	36.58
C7	4.	64	C7	4.72
C8	13.	39	C8	7.89
C9	1.	05	C9	2.01
C10	2.	52	C10	3.63
C11	1.	46	C11	1.98
C12	0.	73	C12	0.44
	Exhaust_100% Construction M			Exhaust_100% Construction Mix
C_Units	1		_Units	2
C3	29.		C3	15.61
C4		02	C4	3.41
C5	11.		C5	12.62
C6	13.	14	C6	36.75
C7	4.	01	C7	4.61
C8	15.	77	C8	6.20
C9	3.	80	C9	2.88
C10	2.	32	C10	3.00
C11		20	C11	2.16
C12	1.	49	C12	1.18
C_Units	Exhaust_50% Food Mix 1	C	_Units	Exhaust_50% Food Mix 2
C3	17.	54	C3	3.30
C4	11.	17	C4	1.45
C5	10.	68	C5	2.69
C6	28.	87	C6	6.11
C7	1.	09	C7	2.57
C8	10.	04	C8	30.83
C9	2.	52	C9	12.21
C10	3.	20	C10	16.72
C11	2.	19	C11	12.67
C12	94.	79	C12	4.84

SynGas Exhaust Total Response as % Carbon Atom units

C_Units Exhaust_33% POL Mix 1 C_Units Exhaust_33% POL Mix 2



ANDREW M. CUC Governor	DMO HOWARD A. ZU Commissioner	JCKER, M.D., J.D	. SALLY DRESLIN, M.S., R.N. Executive Deputy Commissioner
C3	13.33	C3	13,57
C4	7.64	C4	5.66
C5	9.97	C5	6.50
C6	31.17	C6	39.03
C7	5.17	C7	4.68
C8	5.72	C8	6.69
C9	3.66	C9	2.38
C10	7.88	C10	4.51
C11	5.78	C11	1.64
C12	2.57	C12	1,06
C_Units	Exhaust_40% Tire Mix 1	C_Units	Exhaust_40% Tire Mix 2
C3	13.24	C3	12.24
C4	6.45	C4	8.66
C5	7.88	C5	6,99
C6	41.75	C6	36.89
C7	6.80	C7	6.46
C8	6.98	C8	6.07
C9	1.98	C9	2.47
C10	2.63	C10	2.12
C11	2.48	C11	0.57
C12	0.75	C12	0.31
C_Units	Exhaust_50% Plastics Mix		
C3	12.13		
C4	5.22		
C5	10.16		
C6	46.46		
C7	1.07		
C8	7.78		
C9	3.09		
C10	1.43		
C11	0.51		
C12	0.01		



ANDREW M. CUOMO

HOWARD A. ZUCKER, M.D., J.D.

SALLY DRESLIN, M.S., R.N. **Executive Deputy Commissioner**

Governor Commissioner

The total responses of the chromatograms were grouped into classes using extracted ion chromatograms. The classes are based on specific molecular ions and are defined as Alkanes, Cycloalkanes, Alkenes, Alkylbenzenes, Indanes and Naphthalenes.

SynGas Hydrocarbon Fuels Class Group Comparison as Percent of Total Response

Groups	Long Term 1	Construction Mix 1	40% Tires 1	50% Food 1	33% POL 1	50% Plastics
Alkanes	24.3	33.5	20,2	26.1	26.1	24.5
CycloAlkanes	42.7	33.4	38.4	33.7	35.3	43.8
Alkenes	22.2	14.7	21.0	16.0	15.9	21.4
AlkylBenzenes	9.8	15.4	16.9	22.1	19.1	9.2
Indanes	0.9	2.6	3.3	1.8	3.1	1.0
Naphthalenes	0.1	0.3	0.3	0.2	0.5	0.1

		Construction		50%	33%
Groups	Long Term 2	Mix 2	40% Tires 2	Food 2	POL 2
Alkanes	28.5	30.8	21.5	23.4	18.6
CycloAlkanes	32.3	28.8	38.6	36.8	39.8
Alkenes	16.7	13.3	20.9	19.0	24.3
AlkylBenzenes	18.8	22.3	15.9	15.9	14.4
Indanes	3.4	4.2	3.0	4.7	2.7
Naphthalenes	0.3	0.6	0.2	0.2	0.3

Groups	Natural Gas	Reg Gasoline	Kerosine	JP-8 Fuel	#1 Diesel	Heating Oil
Alkanes	57.2	36.1	32.6	27.4	35.6	28.0
CycloAlkanes	36.2	32.8	37.6	31.9	39.2	26.9
Alkenes	1.6	4.5	10.0	8.8	8.4	8.6
AlkylBenzenes	4.7	24.0	16.8	27.4	14.3	27.5
Indanes	0.3	2.3	2.6	4.1	2.0	8.0
Naphthalenes	0.0	0.4	0.5	0.4	0.5	1.1



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SALLY DRESLIN, M.S., R.N. Executive Deputy Commissioner

Exhaust Hydrocarbon Fuels Class Group Comparison as Percent of Total Response

Groups	Long Term 1	Construction Mix 1	40% Tires 1	50% Food 1	33% POL 1
Alkanes	19.3	18.3	19.8	17.4	25.4
CycloAlkanes	25.3	22.8	31.4	32.5	33.1
Alkenes	4.5	10.6	8.6	4.2	8.4
AlkylBenzenes	46.5	41.2	36.8	43.7	29.3
Indanes	3.6	5.9	2.8	1.9	2.7
Naphthalenes	0.7	1.2	0.6	0.4	1.1

		Construction			33%
Groups	Long Term 2	Mix 2	40% Tires 2	50% Food 2	POL 2
Alkanes	22.4	17.6	13.6	15.0	15.1
CycloAlkanes	32.1	24.5	20.7	17.0	20.7
Alkenes	6.4	6.0	10.1	10.1	6.6
AlkylBenzenes	36.6	49.5	54.1	36.4	55.7
Indanes	2.1	1.8	1.1	20.1	1.4
Naphthalenes	0.5	0.6	0.4	1.5	0,5

Groups	50% Plastics	Ref Diesel Exhaust_1	Ref Diesel Exhaust_2
Alkanes	25.4	34.0	27.5
CycloAlkanes	37.6	33.3	30.6
Alkenes	6.9	9.6	8.4
AlkylBenzenes	26.9	17.9	25.1
Indanes	2.9	3.5	5.5
Naphthalenes	0.4	1.9	2.8

The graphical representation of hydrocarbon class results are in shown on the next two pages.



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SALLY DRESLIN, M.S., R.N. Executive Deputy Commissioner

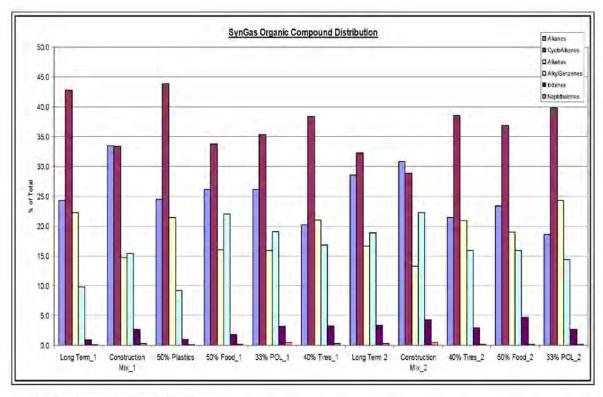


Fig 6.SynGas Organic Compound Distribution



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SALLY DRESLIN, M.S., R.N. Executive Deputy Commissioner

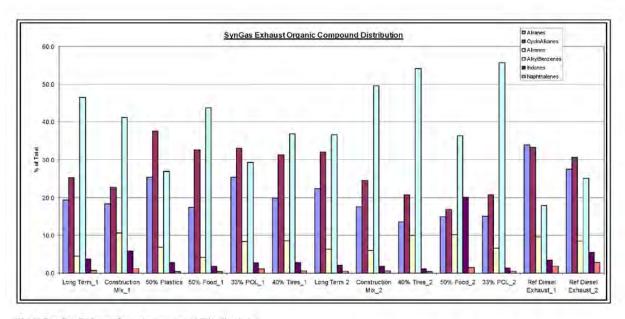


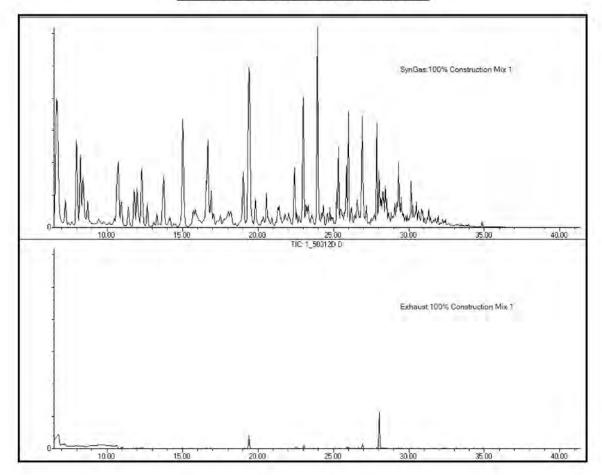
Fig 7. SynGas Exhaust Organic compound Distribution



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Long Term Mix 1 Total Ion Chromatograms

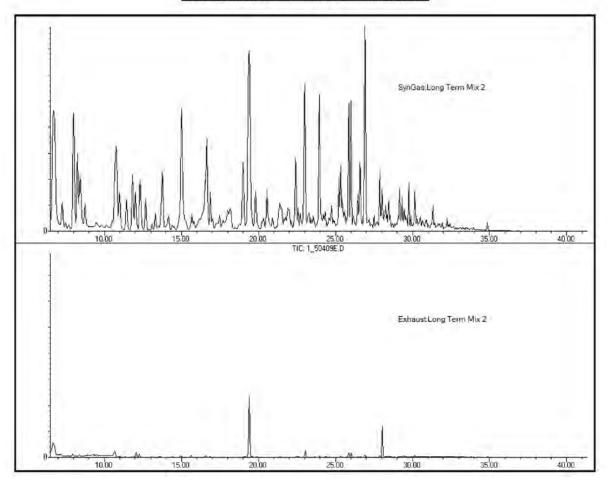




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Long Term Mix 2 Total Ion Chromatograms

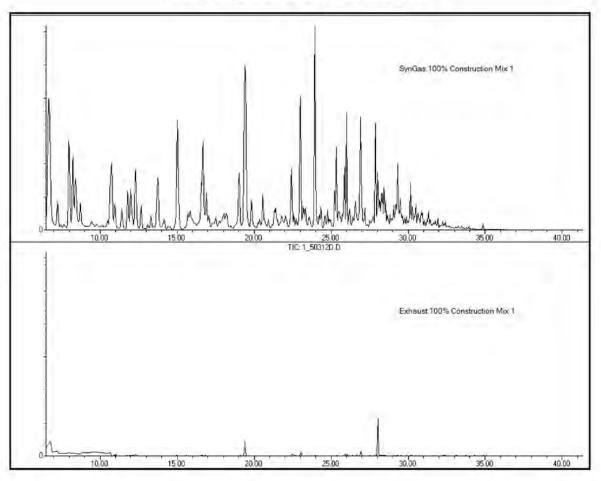




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Construction Mix 1 Total Ion Chromatograms



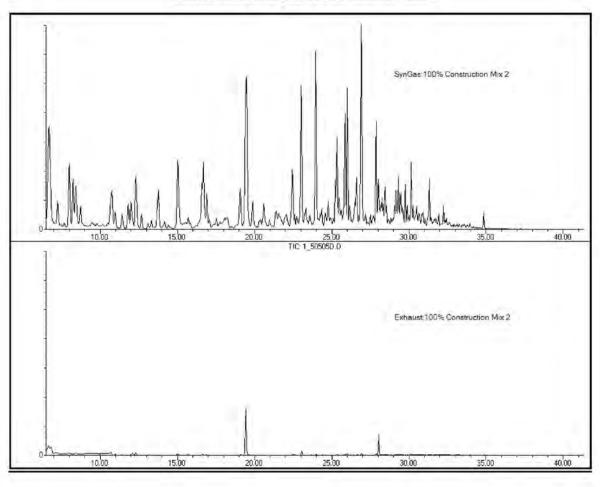
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Construction Mix 2 Total Ion Chromatograms



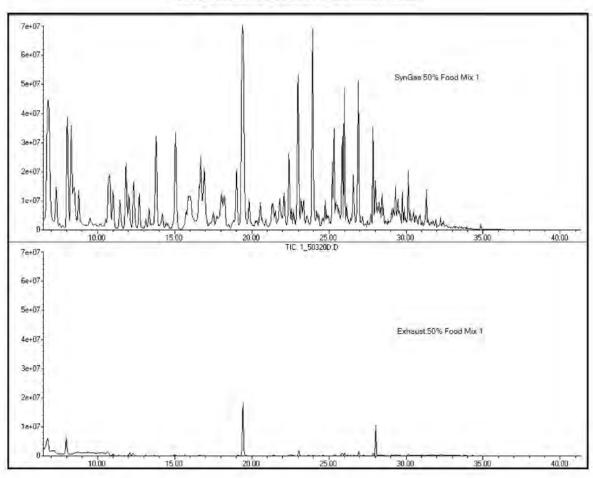
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50% Food Mix 1 Total Ion Chromatograms



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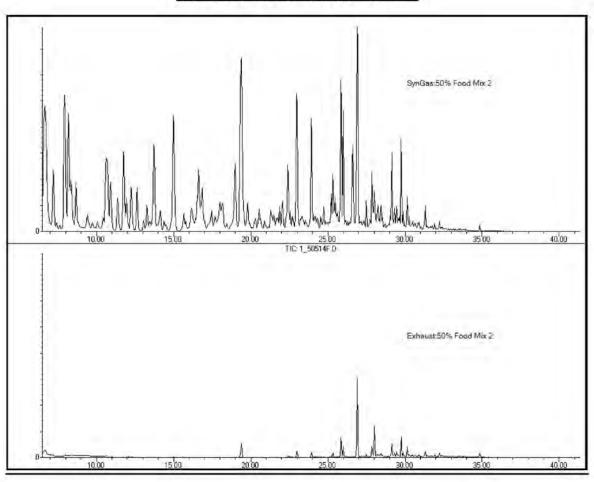


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46

50% Food Mix 2 Total Ion Chromatograms



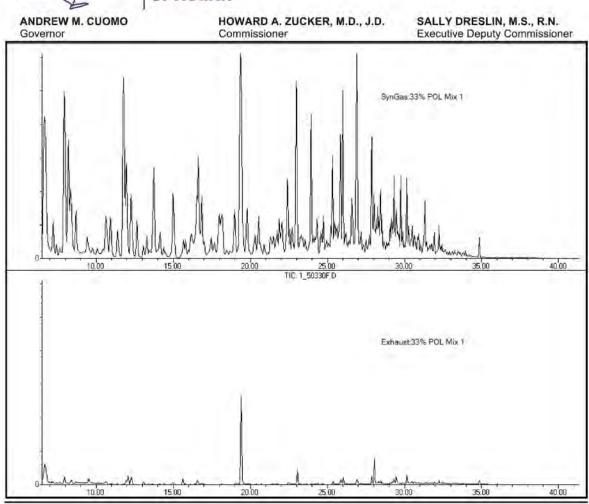


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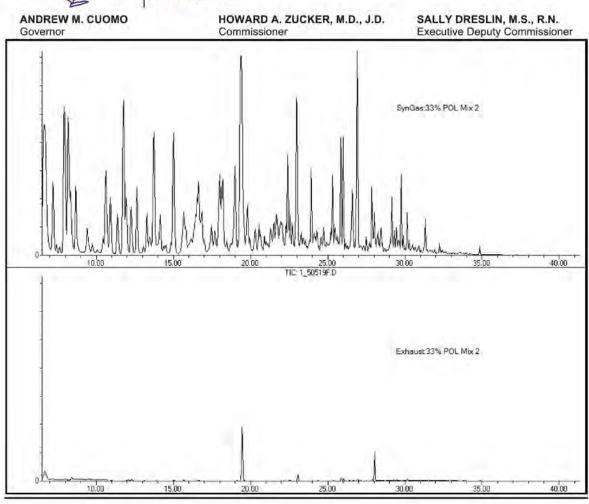
33% POL Mix 1 Total Ion Chromatograms





33% POL Mix 2 Total Ion Chromatograms



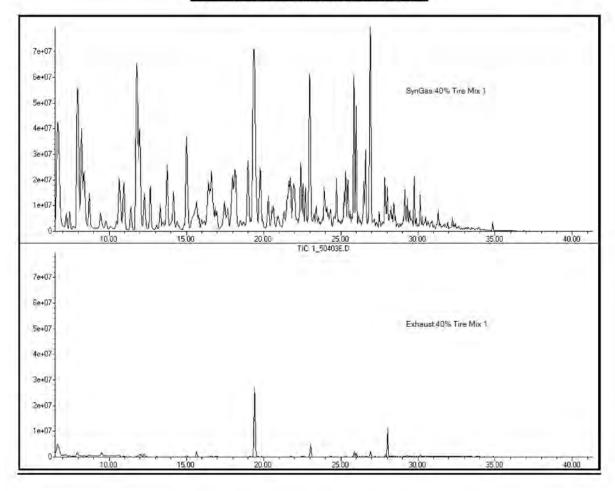




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40% Tire Mix 1 Total Ion Chromatograms

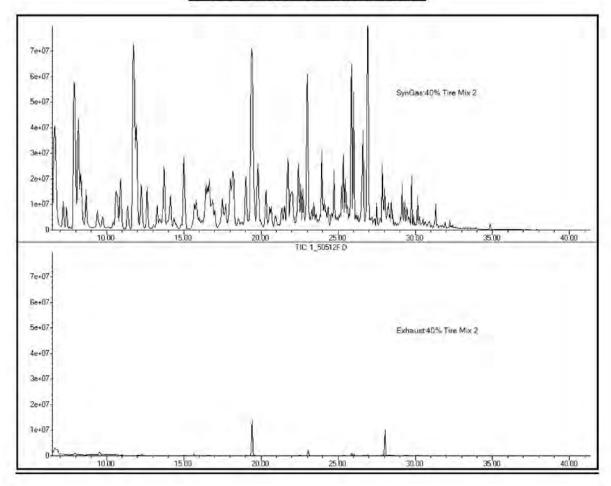




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SALLY DRESLIN, M.S., R.N. Executive Deputy Commissioner

40% Tire Mix 2 Total Ion Chromatograms

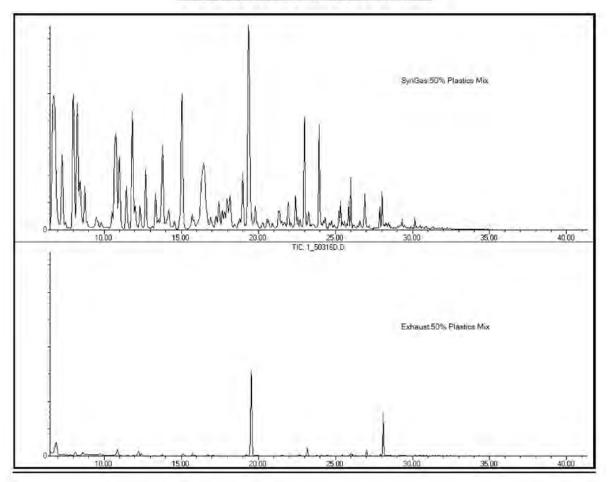




ANDREW M. CUOMO Governor HOWARD A. ZUCKER, M.D., J.D. Commissioner

SALLY DRESLIN, M.S., R.N. Executive Deputy Commissioner

50% Plastics Mix 1 Total Ion Chromatograms



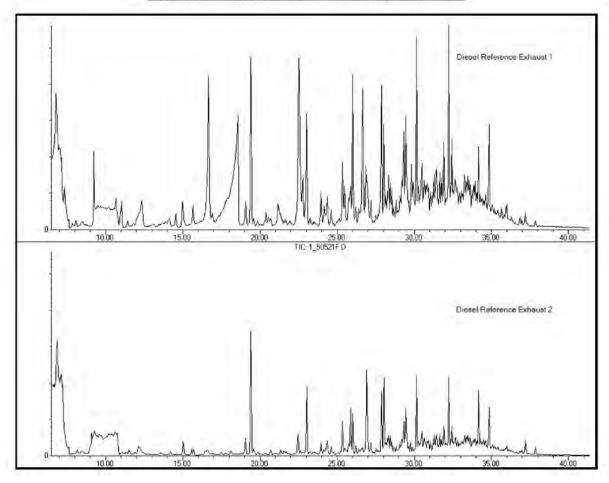
52



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SALLY DRESLIN, M.S., R.N. Executive Deputy Commissioner

Diesel Fuel Reference Exhaust Total Ion Chromatograms



53



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SALLY DRESLIN, M.S., R.N. Executive Deputy Commissioner

Summary

For all of the samples submitted for analysis, data collection began slightly after elution of C₃ due to it's co-elution with CO₂ and water vapor. It's likely the C₃ response is under reported by 15-20%. The Syngas chromatogram responses exhibit an n-alkane and olefin series (propane/propene, butane/butene, etc) to decane (C₁₀). Benzene and styrene are the two major contributors to the total aromatics in the samples. The cycloalkane series is a major contributor to the total response of the samples, which is similar to the volatile fraction of most commercial engine fuels. The target analytes accounted for approximately 45% of the total response of the Syngas samples.

The Syngas exhaust samples are relatively cleaner overall when compared to commercial diesel fuel exhaust samples. The presence of benzene and to some extent, styrene is very large in the Syngas exhaust samples, but the presence of the higher methyl substituted aromatic compounds is not present in the Syngas exhaust samples.

Visible diesel particulate matter (DPM) was observed in the engine exhaust stream at the time when exhaust samples were acquired. A particulate filter was not used at the exhaust sampling point, allowing DPM to freely enter the Summa container at the time of sampling. DPM is known to contain significant amounts of organic carbon, including benzene soluble fractions, which may have partially devolatilized out of the DPM and eluted as unburnt benzene in the diesel exhaust.

Appendix F Ash Analysis for Metals



ANALYTICAL REPORT

Job Number: 480-89453-1

Job Description: Cerl Gasifier - Research Project

For:
U.S. Army Construction Engineering Resea
2902 Newmark Drive
Champaign, IL 61822
Attention: Mr. Stephen Cosper

Joseph V. gireonoge

Approved for telease Joe V Glecomazza Project Management Assistant 6 11/11/2015 10/25 AM

Designee for Brian J Fischer, Manager of Project Management 10 Hazelwood Drive, Amherst, NY, 14228-2298 (716)504-9835 brian.fischer@testamericainc.com

11/11/2015

The test results in this report meet all NELAP requirements for analytes for which accreditation is required or available. Any exceptions to the NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory. All questions regarding this test report should be directed to the TestAmerica Project Manager who has signed this report.

TestAmerica Buffalo NELAC Certifications: CADPH 01169CA, FLDOH E87672, ILEPA 200003, KSDOH E-10187, LADEO 30708, MDH 036-999-337, NHELAP 2973, NJDEP NY455, NHDOH 10026, ORELAP NY200003, PADEP 68-00281, TXCEQ T-104704412-10-1

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TestAmerica Buffalo 10 Hazelwood Drive, Amherst, NY 14228-2298
Tel (716) 691-2600 Fax (716) 691-7991 www.lestamericainc.com



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Job Narrative 480-89453-1

Receipt

The samples were received on 10/20/2015 9/20 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 20.0° C

Metals

Method(s) 7470A: The following samples were received outside the holding time for method 7470A (TCLP Mercury): A-01-020415-1600 (480-89453-1), A-01-031915-1600 (480-89453-2), A-01-040215-1505 (480-89453-3), A-01-050815-1600 (480-89453-4), (480-89453-A-4-H MSD) and (480-89453-A-4-F SD ^).

Method(s) 6010C: The following samples were diluted for TCLP Selenium due to the nature of the sample matrix: A-01-020415-1600 (480-89453-1), A-01-031915-1600 (480-89453-2), A-01-040215-1505 (480-89453-3), A-01-050815-1600 (480-89453-4), (480-89453-A-4-D MS ^), (480-89453-A-4-E MSD), (480-89453-A-4-C PDS) and (480-89453-A-4-C SD ^). Elevated reporting limits (RLs) are provided

Method(s) 6010C. The following samples were received outside the holding time for method 6010C: A-01-020415-1600 (480-89453-1), A-01-031915-1600 (480-89453-2) and A-01-040215-1505 (480-89453-3).

Method(s) 7471B: The following samples were received outside the method holding time for 7471B: A-01-020415-1600 (480-89453-1). A-01-031915-1600 (480-89453-2), A-01-040215-1505 (480-89453-3), A-01-050815-1600 (480-89453-4), (480-89453-A-1-C MS), (480-89453-A-1-D MSD) and (480-89453-A-1-B SD ^).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Organic Prep

Method(s) 1311: Due to the sample matrix and associated reaction to the extraction fluid, the laboratory was unable to perform the leaching procedure with the required 100g for the following samples: A-01-020415-1600 (480-89453-1), A-01-031915-1600 (480-89453-2), A-01-040215-1505 (480-89453-3) and A-01-050815-1600 (480-89453-4). The volume of leaching fluid was adjusted proportionally to maintain a 20:1 ratio of leaching fluid to weight of sample. Reporting limits (RLs) are not affected.

Method(s) 1311: The following samples were prepared outside of preparation holding time. A-01-020415-1600 (480-89453-1), A-01-031915-1600 (480-89453-2), A-01-040215-1505 (480-89453-3) and A-01-050815-1600 (480-89453-4).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

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SAMPLE SUMMARY

Job Number, 480-89453 †

Client. U.S. Army Construction Engineering Resea

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received	
480-89453-1	A-01-020415-1600	Solid	02/04/2015 1600	10/20/2015 0920	
480-89453-2	A-01-031915-1600	Solid	03/19/2015 1600	10/20/2015 0920	
480-89453-3	A-01-040215-1505	Solid	04/02/2015 1505	10/20/2015 0920	
480-89453-4	A-01-050815-1600	Solid	05/08/2015 1600	10/20/2015 0920	

EXECUTIVE SUMMARY - Detections

Job Number: 480-89453-1

Client: U.S. Army Construction Engineering Resea

Lab Sample ID Analyte	Client Sample ID	Result	Qualifier	Reporting Limit	Units	Method
480-89453-1	A-01-020415-1600					
Arsenic	Transfer Arabi	3.6		0.54	mg/Kg	6020A
Barium		382		5.4	mg/Kg	6020A
Cadmium		0.065	J	0.54	mg/Kg	6020A
Chromium		663	В	1.1	mg/Kg	6020A
Silver		0.21	J	0.54	mg/Kg	6020A
Lead		0.70		0.54	mg/Kg	6020A
Percent Moisture		11		0.10	%	2540G
Percent Solids		89		0.10	%	2540G
TCLP						
Barium		3.2	H	1.0	mg/L	6010C
Lead		0.0040	JH	0.020	mg/L	6010C
400 00463 0	A 04 03404E 4000					
480-89453-2 Arsenic	A-01-031915-1600	3.3		0.48	mg/Kg	6020A
Arsenic Barium		350		4.8	mg/Kg mg/Kg	6020A
		636	В	0.95		6020A
Chromium Silver		0.15	J	0.95	mg/Kg	
Lead			J	0.48	mg/Kg	6020A
		0.76	1.0	2.4	mg/Kg	6020A 6020A
Selenium			J		mg/Kg	2540G
Percent Moisture		0.00		0.10	%	
Percent Solids		100		0.10	%	2540G
TCLP		10		2.20	- 0%	200.00
Barium		1.9	Н	1.0	mg/L	6010C
Chromium		0.029	Н	0.020	mg/L	6010C
480-89453-3	A-01-040215-1505					
Arsenic	- 03 311 T 9 8 H 14 1 (2 7 7)	3.3		0.50	mg/Kg	6020A
Barium		517		5.0	mg/Kg	6020A
Cadmium		0.042	J	0.50	mg/Kg	6020A
Chromium		337	В	0.99	mg/Kg	6020A
Silver		0.12	J	0.50	mg/Kg	6020A
Lead		1.0	-	0.50	mg/Kg	6020A
Percent Moisture		0.00		0.10	%	2540G
Percent Solids		100		0.10	%	2540G
TCLP				1.5		2.3
Barium		3.7	н	1.0	mg/L	6010C
Chromium		0.015	1H	0.020	mg/L	6010C
Lead		0.0040	JH	0.020	mg/L	6010C

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EXECUTIVE SUMMARY - Detections

Job Number 480-89453-1

Client: U.S. Army Construction Engineering Resea

Lab Sample ID Analyte	Client Sample ID	Result	Qualifier	Reporting Limit	Units	Method
480-89453-4	A-01-050815-1600	-		17.		
Arsenic		1.9		0.48	mg/Kg	6020A
Barium		351		4.8	mg/Kg	6020A
Chromium		197	В	0.97	mg/Kg	6020A
Silver		0.11	d.	0.48	mg/Kg	6020A
Lead		2.5		0.48	mg/Kg	6020A
Mercury		0.011	JH	0.021	mg/Kg	7471B
Percent Moisture		0.79		0.10	%	2540G
Percent Solids		99		0.10	%	2540G
TCLP						
Barium		3.8	F1	1.0	mg/L	6010C
Lead		0.0074	J	0.020	mg/L	6010C

METHOD SUMMARY

Job Number: 480-89453-1

Client, U.S. Army Construction Engineering Resea

Lab Location	Method	Preparation Method
TAL BUF TAL BUF TAL BUF	SW846 6010C	SW846 1311 SW846 3010A
TAL BUF TAL BUF TAL BUF	SW846 7470A	SW846 1311 SW846 7470A
TAL BUF	SW846 7471B	SW846 7471B
TAL PIT	SW846 6020A	SW846 3050B
TAL PIT	SM22 2540G	
	TAL BUF	TAL BUF SW846 6010C TAL BUF TAL PIT SW846 6020A

Lab References:

TAL BUF = TestAmerica Buffalo

TAL PIT = TestAmerica Pittsburgh

Method References:

SM22 = Standard Methods For The Examination Of Water And Wastewater, 22nd Edition

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition. November 1986 And Its Updates

METHOD / ANALYST SUMMARY

Client: U.S. Army Construction Engineering Resea

Job Number: 480-89453-1

Method	Analyst	Analyst ID
SW846 6010C	Hawrysiak, Allison M	AMH
SW846 6020A	Reinheimer, Bill	WTR
SW846 7470A	Seger, Tiffany A	TAS
SW846 7471B	Seger, Tiffany A	TAS
SM22 2540G	Loheyde, Cheryl	CLL

TestAmerica Buffalo

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Client: U.S. Army Construction Engineering Resea Job Number: 480-89453-1

Client Sample ID: A-01-020415-1600

 Lab Sample ID:
 480-89453-1
 Date Sampled:
 02/04/2015 1600

 Client Matrix:
 Solid
 Date Received:
 10/20/2015 0920

6010C Metals (ICP)-TCLP

Analysis Method 6010C Analysis Batch: 480-270880 Instrument ID: ICAP2 Prep Method: 12102315B-4.asc 3010A Prep Batch: 480-270374 Lab File ID: Dilution: 1.0 Leach Batch 480-270052 Initial Weight/Volume: 50 mL Analysis Date: 10/23/2015 2020 Final Weight/Volume: 50 mL

Prep Date: 10/22/2015 1130 Leach Date: 10/21/2015 941

Analyte DryWt Corrected: N Result (mg/L) Qualifier MDL RL 0.0056 0.015 Arsenic ND Barium 3.2 H 0.10 1.0 Cadmium ND H 0.00050 0.0020 H 0.010 0.0030 ND 0.020 Chromium 0.020 Lead 0.0040 JH Silver ND 0.0017 0.0060

Analysis Method 6010C Analysis Batch: 480-271006 Instrument ID: ICAP2 Prep Method 3010A Prep Batch: 480-270374 Lab File ID: 12102415A-2.asc Dilution: 5.0 Leach Batch: 480-270052 Initial Weight/Volume: 50 mL Analysis Date: 10/24/2015 1053 Final Weight/Volume: 50 mL

Prep Date: 10/22/2015 1130 Leach Date: 10/21/2015 941

 Analyte
 DryWt Corrected: N
 Result (mg/L)
 Qualifier
 MDL
 RL

 Selenium
 ND
 H
 0.044
 0.13

6020A Metals (ICP/MS)

Analysis Batch: 180-159963 6020A Analysis Method: Instrument ID: Prep Method 3050B Prep Batch: 180-159790 Lab File ID: X51109A.xml Initial Weight/Volume: Dilution: 00001.04 g 5.0 Analysis Date: 11/09/2015 2001 Final Weight/Volume: 100 mL

Prep Date: 11/09/2015 1244

10/22/2015 1215

Prep Date:

Qualifier Analyte DryWt Corrected: Y Result (mg/Kg) MDL RL Arsenic 3.6 0.097 0.54 Barium 382 0.058 54 Cadmium 0.065 0.038 0.54 J В 0.033 Chromium 663 Silver 0.21 J 0.021 0.54 Lead 0.70 0.020 0.54 ND 0.27 2.7 Selenium

7470A TCLP Mercury-TCLP

480-270525 LEEMAN2 Analysis Method 7470A Analysis Batch Instrument ID: Prep Method 480-270385 H10225TC.PRN 7470A Prep Batch: Lab File ID: Dilution: 1.0 Leach Batch; 480-270052 Initial Weight/Volume: 30 mL Analysis Date: 10/22/2015 1702 Final Weight/Volume: 50 mL

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Client: U.S. Army Construction Engineering Resea

Job Number: 480-89453-1

A-01-020415-1600 Client Sample ID:

Lab Sample ID: 480-89453-1

Client Matrix: Solid

Date Sampled: 02/04/2015 1600 Date Received: 10/20/2015 0920

7470A TCLP Mercury-TCLP

Leach Date: 10/21/2015 941

Analyte Result (mg/L) Qualifier MDL RL DryWt Corrected: N 0.00012 0.00020 Mercury

7471B Mercury (CVAA)

Analysis Method 7471B Prep Method: 7471B Dilution: 1.0

Mercury

Prep Batch:

Analysis Batch 480-270289 480-270135

LEEMAN2 Instrument ID: Lab File ID: Initial Weight/Volume.

H10215S1.PRN +0.5970 g Final Weight/Volume: 50 mL

10/21/2015 1720 Analysis Date: Prep Date: 10/21/2015 1500

DryWt Corrected Y Analyte

Qualifier MDL Result (mg/Kg) 0.0091 RL 0.022

Client: U.S. Army Construction Engineering Resea Job Number: 480-89453-1

Client Sample ID: A-01-031915-1600

 Lab Sample ID:
 480-89453-2
 Date Sampled: 03/19/2015 1600

 Client Matrix:
 Solid
 Date Received: 10/20/2015 0920

6010C Metals (ICP)-TCLP

Analysis Method 6010C Analysis Batch: 480-270880 Instrument ID: ICAP2 Prep Method: 12102315B-4.asc 3010A Prep Batch: 480-270374 Lab File ID: Dilution: 1.0 Leach Batch 480-270052 Initial Weight/Volume: 50 mL Analysis Date: 10/23/2015 2023 Final Weight/Volume: 50 mL

Prep Date: 10/22/2015 1130 Leach Date: 10/21/2015 941

Analyte DryWt Corrected: N Result (mg/L) Qualifier MDL RL ND 0.0056 0.015 Arsenic Barium 1.9 H 0.10 1.0 Cadmium ND H 0.00050 0.0020 HH 0.010 0.0030 0.029 0.020 Chromium 0.020 Lead ND Silver ND 0.0017 0.0060

Analysis Method 6010C Analysis Batch: 480-271006 Instrument ID: ICAP2 Prep Method 3010A Prep Batch: 480-270374 Lab File ID: 12102415A-2.asc Dilution: 5.0 Leach Batch: 480-270052 Initial Weight/Volume: 50 mL Analysis Date: 10/24/2015 1106 Final Weight/Volume: 50 mL

Prep Date: 10/22/2015 1130 Leach Date: 10/21/2015 941

 Analyte
 DryWt Corrected: N
 Result (mg/L)
 Qualifier
 MDL
 RL

 Selenium
 ND
 H
 0.044
 0.13

6020A Metals (ICP/MS)

6020A 180-159963 Analysis Method: Analysis Batch: Instrument ID: Prep Method 3050B Prep Batch: 180-159790 Lab File ID: X51109A.xml Initial Weight/Volume: Dilution: 00001.05 g 5.0 Analysis Date: 11/09/2015 2006 Final Weight/Volume: 100 mL

Prep Date: 11/09/2015 1244

10/22/2015 1215

Prep Date:

Qualifier RL Analyte DryWt Corrected: Y Result (mg/Kg) MDL Arsenic 0.086 0.48 Barium 350 0.051 4.8 Cadmium ND 0.033 0.48 В Chromium 636 0.029 0.95 Silver 0.15 J 0.019 0.48 Lead 0.76 0.018 0.48 0.24 Selenium 0.44 J 24

7470A TCLP Mercury-TCLP

480-270525 LEEMAN2 Analysis Method 7470A Analysis Batch Instrument ID: Prep Method 480-270385 Lab File ID: H10225TC.PRN 7470A Prep Batch: Dilution: 480-270052 1.0 Leach Batch; Initial Weight/Volume: 30 mL 10/22/2015 1704 Analysis Date: Final Weight/Volume: 50 mL

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Client: U.S. Army Construction Engineering Resea

Job Number: 480-89453-1

A-01-031915-1600 Client Sample ID:

Lab Sample ID: 480-89453-2

Date Sampled: 03/19/2015 1600 Client Matrix: Solid Date Received: 10/20/2015 0920

7470A TCLP Mercury-TCLP

Analyte Result (mg/L) Qualifier MDL RL DryWt Corrected: N 0.00012 0.00020 Mercury ND

7471B Mercury (CVAA)

Analysis Method 7471B Prep Method: 7471B Dilution:

Leach Date:

1.0 10/21/2015 1726

10/21/2015 941

Analysis Batch 480-270289 Prep Batch: 480-270135

LEEMAN2 Instrument ID: Lab File ID: H10215S1.PRN Initial Weight/Volume. +0.5845 g

Final Weight/Volume: 50 mL

MDL

0.0083

Analysis Date: Prep Date: 10/21/2015 1500

DryWt Corrected Y Analyte Mercury

Result (mg/Kg)

Qualifier

RL 0.021

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Client: U.S. Army Construction Engineering Resea

Job Number: 480-89453-1

A-01-040215-1505 Client Sample ID:

Lab Sample ID: 480-89453-3 Date Sampled: 04/02/2015 1505 Client Matrix: Date Received: 10/20/2015 0920 Solid

6010C Metals (ICP)-TCLP

Analysis Method 6010C Analysis Batch: 480-270880 Instrument ID: ICAP2 Prep Method: 480-270374 12102315B-4.asc 3010A Prep Batch: Lab File ID: Dilution: 1.0 Leach Batch 480-270052 Initial Weight/Volume: 50 mL Analysis Date: 10/23/2015 2027 Final Weight/Volume: 50 mL

Prep Date: 10/22/2015 1130 Leach Date: 10/21/2015 941

Analyte DryWt Corrected: N Result (mg/L) Qualifier MDL RL 0.0056 0.015 Arsenic ND Barium 3.7 H 0.10 1.0 Cadmium ND 0.00050 0.0020 H 0.010 0.0030 0.015 0.020 Chromium JH 0.020 Lead 0.0040 JH Silver ND 0.0017 0.0060

Analysis Method 6010C Analysis Batch: 480-271006 Instrument ID: ICAP2 Prep Method 3010A Prep Batch: 480-270374 Lab File ID: 12102415A-2.asc Dilution: 5.0 Leach Batch: 480-270052 Initial Weight/Volume: 50 mL Analysis Date: 10/24/2015 1109 Final Weight/Volume: 50 mL

Prep Date: 10/22/2015 1130 Leach Date: 10/21/2015 941

Analyte DryWt Corrected: N Result (mg/L) Qualifier MDL RL Selenium ND 0.044 0.13

6020A Metals (ICP/MS)

6020A Analysis Batch: 180-159963 Analysis Method: Instrument ID: Prep Method 3050B Prep Batch: 180-159790 Lab File ID: X51109A.xml Initial Weight/Volume: Dilution: 00001.01 g 5.0 11/09/2015 2011 Final Weight/Volume: 100 mL

Analysis Date: 11/09/2015 1244 Prep Date:

10/22/2015 1215

Prep Date:

Qualifier Analyte DryWt Corrected: Y Result (mg/Kg) MDL RL Arsenic 0.090 0.50 Barium 517 0.053 5.0 Cadmium 0.035 0.042 J 0.50 В 0.030 Chromium 337 0.99 Silver 0.12 J 0.019 0.50 Lead 1.0 0.019 0.50 ND 0.25 2.5 Selenium

7470A TCLP Mercury-TCLP

480-270525 LEEMAN2 Analysis Method 7470A Analysis Batch Instrument ID: Prep Method 480-270385 Lab File ID: H10225TC.PRN 7470A Prep Batch: Dilution: 1.0 Leach Batch; 480-270052 Initial Weight/Volume: 30 mL 10/22/2015 1705 Analysis Date: Final Weight/Volume: 50 mL

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Client: U.S. Army Construction Engineering Resea Job Number: 480-89453-1

A-01-040215-1505 Client Sample ID:

Lab Sample ID: 480-89453-3 Date Sampled: 04/02/2015 1505

Client Matrix: Solid Date Received: 10/20/2015 0920

7470A TCLP Mercury-TCLP Leach Date: 10/21/2015 941

Analyte Result (mg/L) Qualifier MDL DryWt Corrected: N RL 0.00012 0.00020 Mercury ND

7471B Mercury (CVAA)

Analysis Batch 480-270289 Analysis Method 7471B LEEMAN2 Instrument ID: Prep Method: 7471B Prep Batch: 480-270135 Lab File ID: H10215S1.PRN

Dilution: Initial Weight/Volume. 1.0 +0.5921 g

10/21/2015 1729 Analysis Date: Final Weight/Volume: 50 mL Prep Date: 10/21/2015 1500

DryWt Corrected Y Qualifier MDL RL Analyte Result (mg/Kg) Mercury 0.0082 0.020

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Client: U.S. Army Construction Engineering Resea

Job Number: 480-89453-1

Client Sample ID: A-01-050815-1600

 Lab Sample ID:
 480-89453-4
 Date Sampled: 05/08/2015 1600

 Client Matrix:
 Solid
 Date Received: 10/20/2015 0920

6010C Metals (ICP)-TCLP

Analysis Method 6010C Analysis Batch: 480-270880 Instrument ID: ICAP2 Prep Method: 12102315B-4.asc 3010A Prep Batch: 480-270374 Lab File ID: Dilution: 1.0 Leach Batch 480-270052 Initial Weight/Volume: 50 mL Analysis Date: 10/23/2015 2040 Final Weight/Volume: 50 mL

Prep Date: 10/22/2015 1130 Leach Date: 10/21/2015 941

Analyte DryWt Corrected: N Result (mg/L) Qualifier MDL RL 0.0056 0.015 Arsenic ND Barium 3.8 F1 0.10 1.0 Cadmium ND 0.00050 0.0020 0.010 0.0030 ND 0.020 Chromium 0.020 Lead 0.0074 Silver ND 0.0017 0.0060

Analysis Method 6010C Analysis Batch: 480-271006 Instrument ID: ICAP2 Prep Method 3010A Prep Batch: 480-270374 Lab File ID: 12102415A-2.asc Dilution: 5.0 Leach Batch: 480-270052 Initial Weight/Volume: 50 mL Analysis Date: 10/24/2015 1113 Final Weight/Volume: 50 mL

Prep Date: 10/22/2015 1130 Leach Date: 10/21/2015 941

 Analyte
 DryWt Corrected: N
 Result (mg/L)
 Qualifier
 MDL
 RL

 Selenium
 ND
 0.044
 0.13

6020A Metals (ICP/MS)

6020A 180-159963 Analysis Method: Analysis Batch: Instrument ID: Prep Method 3050B Prep Batch: 180-159790 Lab File ID: X51109A.xml Dilution: Initial Weight/Volume: 00001.04 g 5.0 Analysis Date: 11/09/2015 2016 Final Weight/Volume: 100 mL

Prep Date: 11/09/2015 1244

10/22/2015 1215

Prep Date:

Qualifier Analyte DryWt Corrected: Y Result (mg/Kg) MDL RL Arsenic 0.088 0.48 Barium 351 0.052 4.8 Cadmium ND 0.034 0.48 В 0.030 Chromium 197 0.97 Silver 0.11 J 0.019 0.48 Lead 2.5 0.018 0.48 0.24 ND 24 Selenium

7470A TCLP Mercury-TCLP

480-270525 LEEMAN2 Analysis Method 7470A Analysis Batch Instrument ID: Prep Method 480-270385 Lab File ID: H10225TC.PRN 7470A Prep Batch: Dilution: 1.0 Leach Batch; 480-270052 Initial Weight/Volume: 30 mL 10/22/2015 1708 Analysis Date: Final Weight/Volume: 50 mL

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Client: U.S. Army Construction Engineering Resea

Job Number: 480-89453-1

Client Sample ID: A-01-050815-1600

Lab Sample ID: 480-89453-4 Client Matrix: Solid

Date Sampled: 05/08/2015 1600 Date Received: 10/20/2015 0920

7470A TCLP Mercury-TCLP
Leach Date: 10/21/2015 941

 Analyte
 DryWt Corrected: N
 Result (mg/L)
 Qualifier
 MDL
 RL

 Mercury
 ND
 H
 0.00012
 0.00020

7471B Mercury (CVAA)

Analysis Method 7471B
Prep Method 7471B
Dilution 1.0

71B Prep Batch:

Analysis Batch: 480-270289 Prep Batch: 480-270135 Instrument ID: Lab File ID: Initial Weight/Volume.

Final Weight/Volume:

MDL

0.0083

LEEMAN2 H10215S1.PRN +0.5874 g 50 mL

Analysis Date: 10/21/2015 1730 Prep Date: 10/21/2015 1500

Analyte DryWt Corrected: Y Mercury Result (mg/Kg) 0.011 Qualifier JH RL 0.021

Job Number: 480-89453-1

Client: U.S. Army Construction Engineering Resea

			Gene	ral Chemi	istry			
Client Sample ID	: A-01-020415	-1600						
Lab Sample ID. Client Matrix:	480-89453-1 Solid					100	17 2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	02/04/2015 1600 10/20/2015 0920
Analyte		Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	Analysis Batch: 1	11 80-158347	Analysis Date	% : 10/27/20	0.10 015 0835	0.10	1.0 Dr	2540G yWt Corrected: N
Percent Solids	Analysis Batch 1	89 80-158347	Analysis Date	% 10/27/20	0.10 015 0835	0.10	1.0 Dr	2540G yWt Corrected: N

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Job Number: 480-89453-1

Client: U.S. Army Construction Engineering Resea

				Gene	ral Chemi	istry			
Client Sample ID	: A-01-031915	5-1600							
Lab Sample ID. Client Matrix:	480-89453-2 Solid								03/19/2015 1600 10/20/2015 0920
Analyte		Result		Qual	Units	RL	RL	Dji	Method
Percent Moisture	Analysis Batch: 1	0.00 80-158347	Analys	sis Date	% : 10/27/20	0.10 015 0835	0.10	1.0 Dr	2540G ryWt Corrected: N
Percent Solids	Analysis Batch 1	100 80-158347	Analys	sis Date	% 10/27/20	0.10 015 0835	0.10	1.0 Dr	2540G ryWt Corrected: N

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Job Number: 480-89453-1

Client: U.S. Army Construction Engineering Resea

			Gene	ral Chem	istry			
Client Sample ID	: A-01-040215-	1505						
Lab Sample ID: Client Matrix:	480-89453-3 Solid					100	The second of the second	04/02/2015 1505 10/20/2015 0920
Analyte		Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	Analysis Batch: 180	0.00 0-158347	Analysis Date	% : 10/27/20	0.10 015 0835	0.10	1.0 Dr	2540G yWt Corrected: N
Percent Solids	Analysis Batch: 180	100 0-158347	Analysis Date	% 10/27/20	0.10 015 0835	0.10	1.0 Di	2540G yWt Corrected: N

Job Number: 480-89453-1

Client: U.S. Army Construction Engineering Resea

			Gene	ral Chemi	istry			
Client Sample ID	: A-01-050815-	1600						
Lab Sample ID: Client Matrix:	480-89453-4 Solid							05/08/2015 1600 10/20/2015 0920
Analyte		Result	Qual	Units	RL	RL	Dji	Method
Percent Moisture	Analysis Batch: 18	0.79 0-158347	Analysis Date	% : 10/27/20	0.10 015 0835	0.10	1.0 Dr	2540G yWt Corrected: N
Percent Solids	Analysis Batch: 18	99 0-158347	Analysis Date	% 10/27/20	0.10 015 0835	0.10	1.0 Dr	2540G yWt Corrected: N

Job Number: 480-89453-1

Client. U.S. Army Construction Engineering Resea

TCLP SPLPW Leachate Blank - Batch: 480-270374

Method: 6010C Preparation: 3010A

TCLP

LB2 480-270052/1-C Lab Sample ID: Client Matrix: Solid Dilution: 1.0 Analysis Date: Prep Date:

10/23/2015 2010 Units: 10/22/2015 1130 10/21/2015 0941

Analysis Batch: 480-270880 Prep Batch: 480-270374 480-270052 Leach Batch: mg/L

Instrument ID: Lab File ID: Initial Weight/Volume: 50 mL

ICAP2 12102315B-4.asc

Final Weight/Volume: 50 mL

Analyte	Result	Qual	MDL	RL
Arsenio	ND		0.0056	0.015
Barium	ND		0.10	1.0
Cadmium	ND		0.00050	0.0020
Chromium	ND		0.010	0.020
Lead	ND		0.0030	0.020
Selenium	ND		0.0087	0.025
Silver	ND		0.0017	0,0060

Method Blank - Batch: 480-270374

Method: 6010C Preparation: 3010A

Lab Sample ID: Client Matrix: Dilution. Analysis Date: Prep Date: Leach Date:

Leach Date:

MB 480-270374/2-A Water 1.0 10/23/2015 2014 10/22/2015 1130 N/A

Analysis Batch Prep Batch: Leach Batch: Units:

480-270880 480-270374 N/A mg/L

Instrument ID: Lab File ID: Initial Weight/Volume: 50 mL

ICAP2 12102315B-4.asc Final Weight/Volume: 50 mL

Analyte Result Qual MDL RL Arsenic ND 0.0056 0.015 ND 0,10 Barium 1.0 0.00050 0.0020 Cadmium ND Chromium ND 0.010 0.020 Lead ND 0.0030 0.020 Selenium 0.0087 0.025 ND Silver ND 0.0017 0.0060

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Job Number: 480-89453-1

Client: U.S. Army Construction Engineering Resea

Lab Control Sample - Batch: 480-270374 Method: 6010C Preparation: 3010A

Lab Sample ID:	LCS 480-270374/3-A	Analysis Batch:	480-270880	Instrument ID:	ICAP2
Client Matrix:	Water	Prep Batch:	480-270374	Lab File ID:	12102315B-4.asc
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	50 mL
Analysis Date:	10/23/2015 2017	Units	mg/L	Final Weight/Volume:	50 mL
Prep Date:	10/22/2015 1130				
Leach Date:	N/A				

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Arsenic	1.00	1.07	107	80 - 120	
Barium	1,00	0.973	97	80 - 120	.1
Cadmium	1.00	1.02	102	80 - 120	
Chromium	1.00	0.982	98	80 - 120	
Lead	1.00	0.980	98	80 - 120	
Selenium	1.00	1.09	109	80 - 120	
Silver	1.00	1.04	104	80 - 120	

Post Digestion Spike - Batch: 480-270374

Preparation: 301	IOA
Instrument ID:	ICAP2
A Company of the Comp	70 700 0 7 7 0

Method: 6010C

Lab Sample ID:	480-89453-4	Analysis Batch:	480-270880	Instrument ID:	ICAP2
Client Matrix:	Solid	Prep Batch:	480-270374	Lab File ID:	12102315B-4.asc
Dilution:	1.0	Leach Batch:	480-270052	Initial Weight/Volume:	50 mL
Analysis Date:	10/23/2015 2047	Units.	mg/L	Final Weight/Volume:	50 mL
Prep Date:	10/22/2015 1130				
Leach Date:	10/21/2015 0941				

Analyte	Sample Result/Qual	Spike Amount	Result	% Rec.	Limit	Qual
Arsenic	ND	1.00	1.18	118	80 - 120	
Barium	3.8	1.00	4.74	96	80 - 120	
Cadmium	ND.	1.00	1.13	113	80 - 120	
Chromium	ND	1.00	0.989	99	80 - 120	
Lead	0.0074 J	1.00	1.03	102	80 - 120	
Silver	ND -	1.00	1.17	117	80 - 120	

Post Digestion Spike - Batch: 480-270374

Method: 6010C Preparation: 3010A TCLP

Selenium		ND	5.00	5.10	102		80 - 120	
Analyte		Sample Result/Qu	al Spike Amount	Result	% Rec		Limit	Qual
Leach Date:	10/21/2015 0941							
Prep Date:	10/22/2015 1130							
Analysis Date:	10/24/2015 1119	Units	mg/L	Final Weight	/Volume:	.50	mL	
Dilution:	5.0	Leach Batch:	480-270052	Initial Weight	t/Volume:	50	mL	
Client Matrix:	Solid	Prep Batch:	480-270374	Lab File ID:		121	02415A-2 as	SC
Lab Sample ID:	480-89453-4	Analysis Batch:	480-271006	Instrument II	D:	ICA	AP2	

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Job Number: 480-89453-1

Client. U.S. Army Construction Engineering Resea

Selenium		97	107	75 - 125	10	20		
Analyte		MS %	Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qua
MSD Lab Sample Client Matrix: Dilution: Analysis Date; Prep Date; Leach Date:	EID: 480-89453-4 Solid 5.0 10/24/2015 1126 10/22/2015 1130 10/21/2015 0941	Prej	lysis Batch: o Batch: ch Batch:	480-271006 480-270374 480-270052		210.71 # 0	ICAP2 I2102415/ 50 mL 50 mL	4-2.asc
MS Lab Sample I Client Matrix: Dilution: Analysis Date: Prep Date: Leach Date:	D: 480-89453-4 Solid 5.0 10/24/2015 1123 10/22/2015 1130 10/21/2015 0941	Pre	lysis Batch: o Batch; ch Batch;	480-271006 480-270374 480-270052	114		ICAP2 (2102415/ 50 mL 50 mL	4-2.asc
	uplicate Recovery Re				Prepar TCLP	d: 6010C ration: 3010A	77.0	
Lead Silver		103 117	97 110	75 - 125 75 - 125	6	20 20		
Chromium		100	94	75 - 125	6	20		
Cadmium		113	107	75 - 125	6	20		
Arsenic Barium		119 100	112 71	75 - 125 75 - 125	6	20 20		F1
Analyte		MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qua
Analysis Date: Prep Date: Leach Date:	10/23/2015 2053 10/22/2015 1130 10/21/2015 0941				Final W	eight/Volume:	50 mL	
MSD Lab Sample Client Matrix: Dilution:	D: 480-89453-4 Solid 1.0	Prej	lysis Batch: o Batch: ch Batch:	480-270880 480-270374 480-270052	Instrum Lab File Initial W	Contract of the Contract of th	ICAP2 I21023158 50 mL	3-4.asc
MS Lab Sample Client Matrix: Dilution: Analysis Date: Prep Date: Leach Date:	D: 480-89453-4 Solid 1.0 10/23/2015 2050 10/22/2015 1130 10/21/2015 0941	Pre	lysis Batch: o Batch: ch Batch:	480-270880 480-270374 480-270052			ICAP2 (2102315) 50 mL 50 mL	3-4.asc
Maurix Spike D	uplicate Recovery Re	eport - Bat	ch: 480-2	70374	Prepar TCLP	d: 6010C ation: 3010A		

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Job Number: 480-89453-1

Client. U.S. Army Construction Engineering Resea

Matrix Spike/

Matrix Spike Duplicate Recovery Report - Batch: 480-270374

Method: 6010C Preparation: 3010A TCLP

MS Lab Sample ID: 480-89453-4

Solid

Units: mg/L

MSD Lab Sample ID: 480-89453-4

MS

1.19

4.78

1.13

0.999

1.04

1.17

Result/Qual

Client Matrix:

Client Matrix: Dilution

Solid 1.0

Dilution: Analysis Date: 1.0 10/23/2015 2050

Analysis Date: Prep Date:

10/23/2015 2053 10/22/2015 1130

Prep Date: Leach Date: 10/22/2015 1130 10/21/2015 0941

Leach Date:

MSD Spike

Amount

1.00

1.00

1.00

1.00 1.00

1.00

10/21/2015 0941

MSD

1.12

4.48

1.07

0.942

0.982 1.10

Result/Qual

Analyte	Sample Result/Qual	MS Spike Amount
Arsenic	ND	1.00
Barium	3.8	1.00
Cadmium	ND	1.00
Chromium	ND	1 00
Lead	0.0074 J	1.00
Silver	ND	1.00

Matrix Spike/

Matrix Spike Duplicate Recovery Report - Batch: 480-270374

Method: 6010C Preparation: 3010A TCLP

MS Lab Sample ID:

Client Matrix: Dilution:

480-89453-4

Solid 5.0

10/24/2015 1123 Analysis Date: Prep Date: 10/22/2015 1130 Leach Date: 10/21/2015 0941

Units: mg/L

MSD Lab Sample ID: 480-89453-4 Client Matrix: Solid

5.0 Dilution 10/24/2015 1126 Analysis Date: Prep Date: 10/22/2015 1130 Leach Date: 10/21/2015 0941

Analyte	Sample	MS Spike	MSD Spike	MS	MSD
	Result/Qual	Amount	Amount	Result/Qual	Result/Qual
Selenium	ND	1.00	1.00	0.970	1.07

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Job Number: 480-89453-1

Client: U.S. Army Construction Engineering Resea

10/21/2015 0941

Serial Dilution - Batch: 480-270374 Method: 6010C Preparation: 3010A TCLP

Analysis Batch: Instrument ID: Lab Sample ID: 480-89453-4 480-270880 ICAP2

Client Matrix: Solid Prep Batch: 480-270374 Lab File ID: 12102315B-4.asc Initial Weight/Volume; 50 mL Dilution: 5.0 Leach Batch: 480-270052 Analysis Date. 10/23/2015 2043 Units: mg/L Final Weight/Volume: 50 mL Prep Date: 10/22/2015 1130

Analyte Sample Result/Qual Result % Diff Limit Qual 10 Arsenic ND ND NC Ĵ Barium 3.8 3.74 1.0 10 Cadmium ND ND NC 10 ND ND Chromium NC 10 0.0074 Lead ND NC 10

Serial Dilution - Batch: 480-270374 Method: 6010C Preparation: 3010A TCLP

ND

ND

ND

NC

NC

10

Lab Sample ID: 480-89453-4 Analysis Batch: 480-271006 Instrument ID: ICAP2 12102415A-2 asc Client Matrix: Solid Prep Batch: 480-270374 Lab File ID: Dilution 480-270052 Initial Weight/Volume: 25 Leach Batch: 50 mL Analysis Date: 10/24/2015 1116 Final Weight/Volume: 50 mL Units: mg/L

Prep Date: 10/22/2015 1130 Leach Date: 10/21/2015 0941

Leach Date:

Silver

Selenium

Sample Result/Qual %Diff Qual Analyte Result Limit ND

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Job Number: 480-89453-1

Client. U.S. Army Construction Engineering Resea

N/A

Leach Date:

Method Blank - Batch: 180-159790 Method: 6020A Preparation: 3050B

Lab Sample ID: MB 180-159790/1-A Analysis Batch: 180-159963 Instrument ID: Client Matrix: Solid Prep Batch: 180-159790 Lab File ID: X51109A.xml Initial Weight/Volume: 00001,04 g Dilution: 1.0 Leach Batch N/A Analysis Date. 11/09/2015 1846 Units: Final Weight/Volume: 100 mL mg/Kg Prep Date: 11/09/2015 1244

Analyte Result Qual MDL RL ND 0.096 Arsenic 0.017 ND 0.010 0.96 Barium Cadmium ND 0.0067 0.096 0.00942 Chromium 0.0059 0.19 0.0038 0.096 Silver ND Lead ND 0.0037 0.096 Selenium ND 0.048 0.48

Lab Control Sample/ Method: 6020A
Lab Control Sample Duplicate Recovery Report - Batch: 180-159790 Preparation: 3050B

LCS Lab Sample ID: LCS 180-159790/2-A Analysis Batch: 180-159963 Instrument ID: Lab File ID: X51109A.xml Client Matrix: Solid Prep Batch: 180-159790 Dilution. 1.0 Leach Batch. N/A Initial Weight/Volume: 00001.02 g Analysis Date: 11/09/2015 1851 Final Weight/Volume: 100 mL Units: mg/Kg Prep Date: 11/09/2015 1244 Leach Date: N/A LCSD Lab Sample ID: LCSD 180-159790/3-A Analysis Batch: 180-159963 Instrument ID:

Client Matrix: Solid Prep Batch: 180-159790 Lab File ID: X51109A.xml Dilution 1.0 Leach Batch: N/A Initial Weight/Volume: 00001.04 g 11/09/2015 1856 Final Weight/Volume: Analysis Date: Units: mg/Kg 100 mL Prep Date: 11/09/2015 1244 Leach Date: N/A

% Rec. LCS Limit RPD RPD Limit LCS Qual LCSD Qual Analyte LCSD Arsenic 93 80 - 120 2 20 93 90 90 80 - 120 2 20 Barium Cadmium 95 94 80 - 120 3 20 Chromium 105 104 80 - 120 3. 20 97 80 - 120 20 Silver 96 4 Lead 100 101 80 - 120 20 Selenium 93 80 - 120 20

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Job Number: 480-89453-1

Client: U.S. Army Construction Engineering Resea

Laboratory Control*l*Laboratory Duplicate Data Report - Batch: 180-159790 Method: 6020A Preparation: 3050B

LCS Lab Sample ID LCS 180-159790/2-A

Units mg/Kg

LCSD Lab Sample ID LCSD 180-159790/3-A Solid

Client Matrix:

Solid

Client Matrix:

Dilution:

Dilution 1.0 Analysis Date: 11/09/2015 1856

Analysis Date: Prep Date:

11/09/2015 1851 11/09/2015 1244

Prep Date: 11/09/2015 1244

Leach Date: N/A

N/A

Leach Date:

Analyte	LCS Spike Amount	LCSD Spike Amount	LCS Result/Qual	LCSD Result/Qual
Arsenic	3.92	3.85	3,65	3.59
Barium	196	192	176.9	173.0
Cadmium	4.90	4.81	4.65	4.51
Chromium	19.6	19.2	20.66	20.06
Silver	4,90	4.81	4.72	4.67
Lead	1.96	1,92	1.97	1.94
Selenium	0.980	0.962	0.911	0.878

Job Number: 480-89453-1

Client. U.S. Army Construction Engineering Resea

TCLP SPLPW Leachate Blank - Batch: 480-270385

Method: 7470A Preparation: 7470A

TCLP

Qual

Lab Sample ID: Client Matrix: Dilution:

LB2 480-270052/1-E Solid 1.0

Analysis Date: 10/22/2015 1653 10/22/2015 1215 Prep Date: Leach Date: 10/21/2015 0941

Analysis Batch: 480-270525 Prep Batch: 480-270385 Leach Batch: 480-270052

mg/L

Units:

Units:

Instrument ID: Lab File ID: Initial Weight/Volume:

LEEMAN2 H10225TC PRN 30 mL

Final Weight/Volume: 50 mL

Analyte

Result ND Mercury

MDL 0.00012 RL 0.00020

Method Blank - Batch: 480-270385

Method: 7470A Preparation: 7470A

Lab Sample ID: Client Matrix: Dilution. Analysis Date

Prep Date:

Leach Date:

MB 480-270385/2-A Water 1.0

10/22/2015 1656 10/22/2015 1215 N/A

480-270525 Analysis Batch: Prep Batch: Leach Batch:

480-270385 N/A mg/L

Instrument ID: Lab File ID: Initial Weight/Volume:

LEEMAN2 H10225TC.PRN 30 mL 50 mL

Result

ND

Final Weight/Volume:

MDL

0.00012

RL

0.00020

Analyte

Mercury Lab Control Sample - Batch: 480-270385

Method: 7470A Preparation: 7470A

Qual

Lab Sample ID: Client Matrix: Dilution.

LCS 480-270385/3-A Water 1.0

Analysis Date: 10/22/2015 1657 Prep Date: 10/22/2015 1215 N/A

Units:

Analysis Batch 480-270525 480-270385 Prep Batch: Leach Batch: N/A mg/L

Instrument ID: Lab File ID: Initial Weight/Volume: Final Weight/Volume:

LEEMAN2 H10225TC.PRN 30 mL 50 mL

Qual

Leach Date:

Mercury

Analyte

Spike Amount 0.00668

Result 0.00645 % Rec. 97

Limit 80 - 120

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Job Number: 480-89453-1

Client. U.S. Army Construction Engineering Resea

Method: 7470A Matrix Spike/ Matrix Spike Duplicate Recovery Report - Batch: 480-270385 Preparation: 7470A TCLP MS Lab Sample ID: 480-89453-4 Analysis Batch: 480-270525 Instrument ID: LEEMAN2 Client Matrix: Solid Prep Batch: 480-270385 Lab File ID: H10225TC:PRN Dilution: 1.0 Leach Batch: 480-270052 Initial Weight/Volume: 30 mL Analysis Date: 10/22/2015 1711 Final Weight/Volume: 50 mL 10/22/2015 1215 Prep Date: Leach Date: 10/21/2015 0941 MSD Lab Sample ID: 480-89453-4 Analysis Batch: 480-270525 Instrument ID: LEEMAN2 H10225TC.PRN Client Matrix: Solid Prep Batch: 480-270385 Lab File ID: Dilution: Initial Weight/Volume: 1.0 Leach Batch: 480-270052 30 mL 10/22/2015 1714 Analysis Date: Final Weight/Volume: 50 mL Prep Date: 10/22/2015 1215 Leach Date: 10/21/2015 0941 % Rec. Analyte Limit RPD Limit MS Qual MSD Qual MSD Mercury 94 94 80 - 120 0 20 Method: 7470A Matrix Spike/ Matrix Spike Duplicate Recovery Report - Batch: 480-270385 Preparation: 7470A TCLP MS Lab Sample ID: 480-89453-4 Units: mg/L MSD Lab Sample ID: 480-89453-4 Client Matrix: Solid Client Matrix: Solid Dilution: 1.0 Dilution 1.0 Analysis Date: 10/22/2015 1711 Analysis Date: 10/22/2015 1714 Prep Date: Prep Date: 10/22/2015 1215 10/22/2015 1215 Leach Date: 10/21/2015 0941 Leach Date: 10/21/2015 0941 MS Spike MSD Spike MSD Sample Analyte Result/Qual Amount Amount Result/Qual Result/Qual 0.00627 Mercury ND 0.00668 0.00668 0.00627 Serial Dilution - Batch: 480-270385 Method: 7470A Preparation: 7470A TCLP 480-89453-4 LEEMAN2 Lab Sample ID. Analysis Batch 480-270525 Instrument ID: Client Matrix: Solid Prep Batch: 480-270385 Lab File ID: H10225TC.PRN Dilution: Leach Batch 480-270052 Initial Weight/Volume. 5.0 30 mL Analysis Date: 10/22/2015 1710 Units mg/L Final Weight/Volume: 50 Prep Date: 10/22/2015 1215 Leach Date: 10/21/2015 0941 Analyte Sample Result/Qual Result % Diff Limit Qual

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ND

NC

10

ND

Mercury

Job Number: 480-89453-1

Client. U.S. Army Construction Engineering Resea

Method Blank - Batch: 480-270135

Method: 7471B Preparation: 7471B

Lab Sample ID: Client Matrix: Dilution:

Analysis Date:

Prep Date:

Leach Date:

MB 480-270135/1-A Solid 1.0

10/21/2015 1714

N/A

10/21/2015 1500

Analysis Batch: 480-270289 Prep Batch: 480-270135

Leach Batch: N/A Units: mg/Kg Instrument ID: Lab File ID: Initial Weight/Volume: +0.5937 g

LEEMAN2 H10215S1.PRN

Final Weight/Volume:

50 mL

Analyte Mercury Result ND

Qual

MDL 0.0082

Limit

51.3 - 148.1

RL 0.020

LCS-Certified Reference Material - Batch: 480-270135

Method: 7471B Preparation: 7471B

Lab Sample ID: Client Matrix: Dilution. Analysis Date

Solid 1.0

10/21/2015 1718 10/21/2015 1500

LCSSRM 480-270135/2-F Analysis Batch: 480-270289 Prep Batch: 480-270135 N/A Leach Batch: Units:

mg/Kg

Instrument ID: Lab File ID: Initial Weight/Volume:

LEEMAN2 H10215S1.PRN +0.0239 g Final Weight/Volume: 50 mL

Prep Date: Leach Date: N/A

Analyte

Spike Amount 8.37

Analysis Batch:

Prep Batch

Leach Batch:

Result 9.27

480-270289

480-270135

N/A

% Rec. 110.7

LEEMAN2

+0.5942 g

H10215S1.PRN

Qual

Matrix Spike/

Mercury

Matrix Spike Duplicate Recovery Report - Batch: 480-270135

Method: 7471B Preparation: 7471B

Initial Weight/Volume:

Final Weight/Volume: 50 mL

Instrument ID:

Lab File ID

MS Lab Sample ID: 480-89453-1 Client Matrix: Solid Dilution: 1.0 Analysis Date:

10/21/2015 1723 Prep Date: 10/21/2015 1500 N/A

Leach Date:

MSD Lab Sample ID: 480-89453-1 Client Matrix: Solid Dilution: 1.0

Analysis Date: 10/21/2015 1725 Prep Date: 10/21/2015 1500 Leach Date: N/A

Analysis Batch: 480-270289 480-270135 Prep Batch: Leach Batch: N/A

Instrument ID: Lab File ID Initial Weight/Volume:

LEEMAN2 H10215S1.PRN +0.5954 g

MSD

101

100

Limit 80 - 120 Final Weight/Volume:

50 mL

RPD Limit MS Qual MSD Qual

MS

Analyte

0 20

TestAmerica Buffalo

Mercury

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Job Number: 480-89453-1

Client. U.S. Army Construction Engineering Resea

Matrix Spike/

Method: 7471B

Dilution

Matrix Spike Duplicate Recovery Report - Batch: 480-270135

Units: mg/Kg

Preparation: 7471B

MS Lab Sample ID: 480-89453-1 Client Matrix: Solid Dilution:

1.0

Analysis Date: 10/21/2015 1723 Prep Date: 10/21/2015 1500 Leach Date: N/A

Analysis Date:

Leach Date: N/A

Client Matrix: Solid 1.0

10/21/2015 1725 Prep Date: 10/21/2015 1500

MSD Lab Sample ID: 480-89453-1

Sample MS Spike MSD Spike MS MSD Analyte Result/Qual Amount Amount Result/Qual Result/Qual 0.378 0.378 Mercury ND 0.376 0.376

Serial Dilution - Batch: 480-270135

Method: 7471B Preparation: 7471B

Lab Sample ID. Client Matrix: Dilution: Analysis Date:

Prep Date:

480-89453-1 Solid 5.0

10/21/2015 1721 10/21/2015 1500

N/A

Analysis Batch 480-270289 Prep Batch: 480-270135 Leach Batch:

Units:

N/A mg/Kg Instrument ID:

LEEMAN2 Lab File ID: H10215S1 PRN Initial Weight/Volume: +0.5970 g Final Weight/Volume: 50 mL

Leach Date:

Analyte Sample Result/Qual %Diff Qual Result Limit Mercury ND ND NC. 10

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DATA REPORTING QUALIFIERS

Job Number: 480-89453-1

Client: U.S. Army Construction Engineering Resea

Lab Section	Qualifier	Description
Metals		
	B	Compound was found in the blank and sample
	F1	MS and/or MSD Recovery is outside acceptance limits.
	J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
	e	Sample was prepped or analyzed beyond the specified holding time

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Job Number: 480-89453-1

Client: U.S. Army Construction Engineering Resea

QC Association Summary

Lab Sample ID	Client Sample ID	Report	Client Matrix	Method	Prep Batch
Metals			2 7 D 7 D 1 D 1 D 1 D 1		11796
HICKORY CO.					
Prep Batch: 180-159790	1.1.0.1.10	· 4	D-85	noron.	
LCS 180-159790/2-A	Lab Control Sample	Ţ	Solid	3050B	
LCSD 180-159790/3-A	Lab Control Sample Duplicate	T T T	Solid	3050B	
MB 180-159790/1-A	Method Blank	1	Solid	3050B	
180-89453-1	A-01-020415-1600	1	Solid	3050B	
480-89453-2	A-01-031915-1600		Solid	3050B	
480-89453-3	A-01-040215-1505	T	Solid	3050B	
180-89453-4	A-01-050815-1600	T	Solid	3050B	
Analysis Batch: 180-15996	53				
CS 180-159790/2-A	Lab Control Sample	T	Solid	6020A	180-159790
CSD 180-159790/3-A	Lab Control Sample Duplicate	T	Solid	6020A	180-159790
MB 180-159790/1-A	Method Blank	T	Solid	6020A	180-159790
180-89453-1	A-01-020415-1600	T	Solid	6020A	180-159790
80-89453-2	A-01-031915-1600	T	Solid	6020A	180-159790
80-89453-3	A-01-040215-1505	T	Solid	6020A	180-159790
180-89453-4	A-01-050815-1600	T	Solid	6020A	180-159790
Prep Batch: 480-270052					
LB2 480-270052/1-C	TCLP SPLPW Leachate Blank	P	Solid	1311	
B2 480-270052/1-E	TCLP SPLPW Leachate Blank	P	Solid	1311	
480-89453-1	A-01-020415-1600	P	Solid	1311	
180-89453-2	A-01-031915-1600	P	Solid	1311	
180-89453-3	A-01-040215-1505	P	Solid	1311	
180-89453-4	A-01-040213-1303 A-01-050815-1600	P	Solid	1311	
180-89453-4MS	Matrix Spike	P	Solid	1311	
480-89453-4MSD	Matrix Spike Duplicate	P	Solid	1311	
Prep Batch: 480-270135					
CSSRM 480-270135/2-A	LCS-Certified Reference Material	+	Solid	7471B	
MB 480-270135/1-A	Method Blank	Ť	Solid	7471B	
the contract of the contract o	A-01-020415-1600	4	Solid		
180-89453-1	ALTONOMY TO PROGRAM TO SOLUTION OF THE SOLUTIO	T T T T		7471B	
180-89453-1MS	Matrix Spike	1	Solid	7471B	
180-89453-1MSD	Matrix Spike Duplicate	+	Solid	7471B	
180-89453-2	A-01-031915-1600	4	Solid	7471B	
480-89453-3	A-01-040215-1505		Solid	7471B	
480-89453-4	A-01-050815-1600	T	Solid	7471B	

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Job Number: 480-89453-1

Client: U.S. Army Construction Engineering Resea

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
Metals					
Analysis Batch: 480-2702	89				
LCSSRM 480-270135/2-A	LCS-Certified Reference Material	T	Solid	7471B	480-270135
MB 480-270135/1-A	Method Blank	T	Solid	7471B	480-270135
480-89453-1	A-01-020415-1600	T	Solid	7471B	480-270135
480-89453-1MS	Matrix Spike	T	Solid	7471B	480-270135
480-89453-1MSD	Matrix Spike Duplicate	T T T	Solid	7471B	480-270135
480-89453-2	A-01-031915-1600	T	Solid	7471B	480-270135
480-89453-3	A-01-040215-1505	T	Solid	7471B	480-270135
480-89453-4	A-01-050815-1600	T	Solid	7471B	480-270135
Prep Batch: 480-270374					
CS 480-270374/3-A	Lab Control Sample	T	Water	3010A	
MB 480-270374/2-A	Method Blank	Ť	Water	3010A	
B2 480-270052/1-C	TCLP SPLPW Leachate Blank	P	Solid	3010A	480-270052
480-89453-1	A-01-020415-1600	P	Solid	3010A	480-270052
480-89453-2	A-01-031915-1600	P	Solid	3010A	480-270052
480-89453-3	A-01-040215-1505	P	Solid	3010A	480-270052
180-89453-4	A-01-050815-1600	P	Solid	3010A	480-270052
480-89453-4MS	Matrix Spike	P	Solid	3010A	480-270052
480-89453-4MSD	Matrix Spike Duplicate	P	Solid	3010A	480-270052
Prep Batch: 480-270385					
CS 480-270385/3-A	Lab Control Sample	T	Water	7470A	
MB 480-270385/2-A	Method Blank	T	Water	7470A	
LB2 480-270052/1-E	TCLP SPLPW Leachate Blank	P	Solid	7470A	480-270052
480-89453-1	A-01-020415-1600	P.	Solid	7470A	480-270052
180-89453-2	A-01-031915-1600	P	Solid	7470A	480-270052
480-89453-3	A-01-040215-1505	P	Solid	7470A	480-270052
480-89453-4	A-01-050815-1600	P	Solid	7470A	480-270052
480-89453-4MS	Matrix Spike	P	Solid	7470A	480-270052
480-89453-4MSD	Matrix Spike Duplicate	P	Solid	7470A	480-270052
Analysis Batch: 480-2705					
LB2 480-270052/1-E	TCLP SPLPW Leachate Blank	P	Solid	7470A	480-270385
LCS 480-270385/3-A	Lab Control Sample	T	Water	7470A	480-270385
MB 480-270385/2-A	Method Blank	T	Water	7470A	480-270385
180-89453-1	A-01-020415-1600	P	Solid	7470A	480-270385
480-89453-2	A-01-031915-1600	P	Solid	7470A	480-270385
480-89453-3	A-01-040215-1505	P	Solid	7470A	480-270385
480-89453-4	A-01-050815-1600	P	Solid	7470A	480-270385
480-89453-4MS	Matrix Spike	P	Solid	7470A	480-270385
480-89453-4MSD	Matrix Spike Duplicate	P	Solid	7470A	480-270385

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Job Number 480-89453-1

Client: U.S. Army Construction Engineering Resea

QC Association Summary

		Report			
Lab Sample ID	Client Sample ID	Basis	Client Matrix	Method	Prep Batch
Metals					
Analysis Batch:480-27	70880				
LB2 480-270052/1-C	TCLP SPLPW Leachate Blank	P	Solid	6010C	480-270374
LCS 480-270374/3-A	Lab Control Sample	T	Water	6010C	480-270374
MB 480-270374/2-A	Method Blank	T	Water	6010C	480-270374
480-89453-1	A-01-020415-1600	P	Solid	6010C	480-270374
480-89453-2	A-01-031915-1600	P	Solid	6010C	480-270374
480-89453-3	A-01-040215-1505	P	Solid	6010C	480-270374
480-89453-4	A-01-050815-1600	P	Solid	6010C	480-270374
480-89453-4MS	Matrix Spike	P	Solid	6010C	480-270374
480-89453-4MSD	Matrix Spike Duplicate	P	Solid	6010C	480-270374
Analysis Batch: 480-27	1006				
480-89453-1	A-01-020415-1600	P	Solid	6010C	480-270374
480-89453-2	A-01-031915-1600	P	Solid	6010C	480-270374
480-89453-3	A-01-040215-1505	P	Solid	6010C	480-270374
480-89453-4	A-01-050815-1600	P	Solid	6010C	480-270374
480-89453-4MS	Matrix Spike	P	Solid	6010C	480-270374
480-89453-4MSD	Matrix Spike Duplicate	P	Solid	6010C	480-270374
Report Basis					
T = Total					
General Chemistry					
Analysis Batch:180-15					
480-89453-1	A-01-020415-1600	T	Solid	2540G	
480-89453-2	A-01-031915-1600	T	Solid	2540G	
480-89453-3	A-01-040215-1505	T	Solid	2540G	
480-89453-4	A-01-050815-1600	T	Solid	2540G	

Report Basis T = Total

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Job Number: 480-89453-1

Client: U.S. Army Construction Engineering Resea

Laboratory Chronicle

Lab ID: 480-89453-1 Client ID: A-01-020415-1600

Sample Date/Time: 02/04/2015 16:00 Received Date/Time: 10/20/2015 09:20

Method	Bottle ID	Run	Analysis Batch	Prep Batch	Date Prepared / Analyzed	Dil	Lab	Analyst
P:3010A	480-89453-A-1-E		480-270880	480-270374	10/22/2015 11:30	1	TAL BUF	KJ1
A:6010C	480-89453-A-1-E		480-270880	480-270374	10/23/2015 20:20	1	TAL BUF	AMH
P.3010A	480-89453-A-1-E ^5		480-271006	480-270374	10/22/2015 11:30	5	TAL BUF	KJ1
A 6010C	480-89453-A-1-E ^5		480-271006	480-270374	10/24/2015 10:53	5	TAL BUF	AMH
P:3050B	480-89453-A-1-H ^5		180-159963	180-159790	11/09/2015 12:44	5	TAL PIT	ВМН
A:6020A	480-89453-A-1-H ^5		180-159963	180-159790	11/09/2015 20:01	5	TAL PIT	WTR
P:7470A	480-89453-A-1-F		480-270525	480-270385	10/22/2015 12:15	1	TAL BUF	TAS
A:7470A	480-89453-A-1-F		480-270525	480-270385	10/22/2015 17:02	1	TAL BUF	TAS
P:7471B	480-89453-A-1-B		480-270289	480-270135	10/21/2015 15:00	1	TAL BUF	TAS
A:7471B	480-89453-A-1-B		480-270289	480-270135	10/21/2015 17:20	1	TAL BUF	TAS
A:2540G	480-89453-A-1		180-158347		10/27/2015 08:35	1	TAL PIT	CLL

Lab ID: 480-89453-1 MS Client ID: A-01-020415-1600

Sample Date/Time: 02/04/2015 18:00 Received Date/Time: 10/20/2015 09:20

Analysis Date Prepared / Method Bottle ID Batch Prep Batch Analyzed Lab Analyst P:7471B 480-89453-A-1-C MS 480-270135 10/21/2015 15:00 480-270289 TAL BUF TAS A:7471B 480-89453-A-1-C MS 480-270289 480-270135 10/21/2015 17:23 TAL BUF TAS

Lab ID: 480-89453-1 MSD Client ID: A-01-020415-1600

Sample Date/Time: 02/04/2015 16:00 Received Date/Time 10/20/2015 09:20

Analysis Date Prepared / Batch Prep Batch Analyzed Method Bottle ID Run Dil Analyst Lab P:7471B 480-89453-A-1-D 480-270135 TAL BUF MSD A:7471B 480-89453-A-1-D 480-270135 10/21/2015 17:25 TAL BUF TAS MSD

Lab ID: 480-89453-1 SD Client ID: A-01-020415-1600

Sample Date/Time 02/04/2015 16:00 Received Date/Time 10/20/2015 09:20

Analysis Date Prepared / Method Batch Analyzed Bottle ID Run Prep Batch Dil Lab Analyst P:7471B 480-270289 480-270135 10/21/2015 15:00 TAL BUF A:7471B 480-89453-A-1-B SD 480-270289 480-270135 10/21/2015 17:21 TALBUF TAS

TestAmerica Buffalo A = Analytical Method P = Prep Method

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Job Number: 480-89453-1

Client: U.S. Army Construction Engineering Resea

Laboratory Chronicle

Lab ID: 480-89453-2

Client ID: A-01-031915-1600

Sample Date/Time: 03/19/2015 18:00 Received Date/Time: 10/20/2015 09:20

Method	Bottle ID	Run	Analysis Batch	Prep Batch	Date Prepared / Analyzed	Dil	Lab	Analyst
P:3010A	480-89453-A-2-C		480-270880	480-270374	10/22/2015 11:30	1	TAL BUF	KJ1
A:6010C	480-89453-A-2-C		480-270880	480-270374	10/23/2015 20:23	1	TAL BUF	AMH
P.3010A	480-89453-A-2-C ^5		480-271006	480-270374	10/22/2015 11:30	5	TAL BUF	KJ1
A 6010C	480-89453-A-2-C ^5		480-271006	480-270374	10/24/2015 11:06	5	TAL BUF	AMH
P:3050B	480-89453-A-2-F ^5		180-159963	180-159790	11/09/2015 12:44	5	TAL PIT	вмн
A:6020A	480-89453-A-2-F ^5		180-159963	180-159790	11/09/2015 20:06	5	TAL PIT	WTR
P:7470A	480-89453-A-2-D		480-270525	480-270385	10/22/2015 12:15	1	TAL BUF	TAS
A:7470A	480-89453-A-2-D		480-270525	480-270385	10/22/2015 17:04	1	TAL BUF	TAS
P:7471B	480-89453-A-2-B		480-270289	480-270135	10/21/2015 15:00	1	TAL BUF	TAS
A:7471B	480-89453-A-2-B		480-270289	480-270135	10/21/2015 17:26	1	TAL BUF	TAS
A:2540G	480-89453-A-2		180-158347		10/27/2015 08:35	1	TALPIT	CLL

Lab ID: 480-89453-3

Client ID: A-01-040215-1505

Sample Date/Time: 04/02/2015 15:05 Received Date/Time: 10/20/2015 09:20

Method	Bottle ID	Run	Analysis Batch	Prep Batch	Date Prepared I Analyzed	Dil	Lab	Analyst
P:3010A	480-89453-A-3-C		480-270880	480-270374	10/22/2015 11:30	1	TAL BUF	KJ1
A:6010C	480-89453-A-3-C		480-270880	480-270374	10/23/2015 20:27	1	TAL BUF	AMH
P:3010A	480-89453-A-3-C ^5		480-271006	480-270374	10/22/2015 11:30	5	TAL BUF	KJ1
A:6010C	480-89453-A-3-C ^5		480-271006	480-270374	10/24/2015 11:09	5	TAL BUF	AMH
P:3050B	480-89453-A-3-F ^5		180-159963	180-159790	11/09/2015 12:44	5	TAL PIT	BMH
A:6020A	480-89453-A-3-F ^5		180-159963	180-159790	11/09/2015 20:11	5	TAL PIT	WTR
P:7470A	480-89453-A-3-D		480-270525	480-270385	10/22/2015 12:15	1	TAL BUF	TAS
A:7470A	480-89453-A-3-D		480-270525	480-270385	10/22/2015 17:05	1	TAL BUF	TAS
P:7471B	480-89453-A-3-B		480-270289	480-270135	10/21/2015 15:00	1	TAL BUF	TAS
A:7471B	480-89453-A-3-B		480-270289	480-270135	10/21/2015 17:29	1	TAL BUF	TAS
A:2540G	480-89453-A-3		180-158347		10/27/2015 08:35	1	TAL PIT	CLL

TestAmerica Buffalo

A = Analytical Method

P = Prep Method

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Job Number: 480-89453-1

Client: U.S. Army Construction Engineering Resea

Laboratory Chronicle

Lab ID: 480-89453-4 Client ID: A-01-050815-1600

Sample Date/Time: 05/08/2015 16:00 Received Date/Time: 10/20/2015 09:20

Bottle ID	Run	Analysis Batch	Prep Batch	Date Prepared / Analyzed	Dil	Lab	Analyst
480-89453-A-4-C		480-270880	480-270374	10/22/2015 11:30	1	TAL BUF	KJ1
480-89453-A-4-C		480-270880	480-270374	10/23/2015 20:40	1	TAL BUF	AMH
480-89453-A-4-C ^5		480-271006	480-270374	10/22/2015 11:30	5	TAL BUF	KJ1
480-89453-A-4-C ^5		480-271006	480-270374	10/24/2015 11:13	5	TAL BUF	AMH
480-89453-A-4-J ^5		180-159963	180-159790	11/09/2015 12:44	5	TAL PIT	BMH
480-89453-A-4-J ^5		180-159963	180-159790	11/09/2015 20:16	5	TAL PIT	WTR
480-89453-A-4-F		480-270525	480-270385	10/22/2015 12:15	1	TAL BUF	TAS
480-89453-A-4-F		480-270525	480-270385	10/22/2015 17:08	1	TAL BUF	TAS
480-89453-A-4-B		480-270289	480-270135	10/21/2015 15:00	1	TAL BUF	TAS
480-89453-A-4-B		480-270289	480-270135	10/21/2015 17:30	1	TAL BUF	TAS
480-89453-A-4		180-158347		10/27/2015 08:35	1	TALPIT	CLL
	480-89453-A-4-C 480-89453-A-4-C ^5 480-89453-A-4-C ^5 480-89453-A-4-J ^5 480-89453-A-4-J ^5 480-89453-A-4-F 480-89453-A-4-F 480-89453-A-4-B 480-89453-A-4-B	480-89453-A-4-C 480-89453-A-4-C 480-89453-A-4-C ^5 480-89453-A-4-J ^5 480-89453-A-4-J ^5 480-89453-A-4-F 480-89453-A-4-F 480-89453-A-4-B 480-89453-A-4-B	Bottle ID Run Batch 480-89453-A-4-C 480-270880 480-89453-A-4-C 480-271006 480-89453-A-4-C ^5 480-271006 480-89453-A-4-C ^5 480-271006 480-89453-A-4-J ^5 180-159963 480-89453-A-4-J ^5 180-159963 480-89453-A-4-F 480-270525 480-89453-A-4-F 480-270525 480-89453-A-4-B 480-270289 480-89453-A-4-B 480-270289	Bottle ID Run Batch Prep Batch 480-89453-A-4-C 480-270880 480-270374 480-89453-A-4-C 480-270880 480-270374 480-89453-A-4-C ^5 480-271006 480-270374 480-89453-A-4-J ^5 180-159963 180-159790 480-89453-A-4-J ^5 180-159963 180-159790 480-89453-A-4-F 480-270525 480-270385 480-89453-A-4-F 480-270525 480-270385 480-89453-A-4-B 480-270289 480-270135 480-89453-A-4-B 480-270289 480-270135	Bottle ID Run Batch Prep Batch Analyzed 480-89453-A-4-C 480-270880 480-270374 10/22/2015 11:30 480-89453-A-4-C 480-270880 480-270374 10/23/2015 20:40 480-89453-A-4-C ^5 480-271006 480-270374 10/22/2015 11:30 480-89453-A-4-J ^5 180-159963 180-159790 11/09/2015 12:44 480-89453-A-4-F 480-270525 480-270385 10/22/2015 12:15 480-89453-A-4-B 480-270525 480-270385 10/22/2015 17:08 480-89453-A-4-B 480-270289 480-270135 10/21/2015 15:00 480-89453-A-4-B 480-270289 480-270135 10/21/2015 17:30	Bottle ID Run Batch Prep Batch Analyzed Dil 480-89453-A-4-C 480-270880 480-270374 10/22/2015 11:30 1 480-89453-A-4-C 480-270880 480-270374 10/23/2015 20:40 1 480-89453-A-4-C ^5 480-271006 480-270374 10/22/2015 11:30 5 480-89453-A-4-C ^5 480-271006 480-270374 10/24/2015 11:13 5 480-89453-A-4-J ^5 180-159963 180-159790 11/09/2015 12:44 5 480-89453-A-4-F 480-270525 480-270385 10/22/2015 12:15 1 480-89453-A-4-B 480-270289 480-270135 10/21/2015 15:00 1 480-89453-A-4-B 480-270289 480-270135 10/21/2015 17:30 1	Bottle ID Run Batch Prep Batch Analyzed Dil Lab 480-89453-A-4-C 480-270880 480-270374 10/22/2015 11:30 1 TAL BUF 480-89453-A-4-C 480-270880 480-270374 10/23/2015 20:40 1 TAL BUF 480-89453-A-4-C ^5 480-271006 480-270374 10/22/2015 11:30 5 TAL BUF 480-89453-A-4-C ^5 480-271006 480-270374 10/24/2015 11:13 5 TAL BUF 480-89453-A-4-J ^5 180-159963 180-159790 11/09/2015 12:44 5 TAL PIT 480-89453-A-4-F 480-270525 480-270385 10/22/2015 12:15 1 TAL BUF 480-89453-A-4-F 480-270525 480-270385 10/22/2015 17:08 1 TAL BUF 480-89453-A-4-B 480-270289 480-270135 10/21/2015 15:00 1 TAL BUF 480-89453-A-4-B 480-270289 480-270135 10/21/2015 17:30 1 TAL BUF

Lab ID: 480-89453-4 MS Client ID: A-01-050815-1600

Sample Date/Time: 05/08/2015 18:00 Received Date/Time: 10/20/2015 09:20

Method	Bottle ID	Run	Analysis Batch	Prep Batch	Date Prepared i Analyzed	Dil	Lab	Analyst
P:3010A	480-89453-A-4-D MS	-	480-270880	480-270374	10/22/2015 11:30	4	TAL BUF	KJ1
A 6010C	480-89453-A-4-D MS		480-270880	480-270374	10/23/2015 20:50	1	TAL BUF	AMH
P:3010A	480-89453-A-4-D MS		480-271006	480-270374	10/22/2015 11:30	5	TAL BUF	KJ1
A:6010C	480-89453-A-4-D MS ^5		480-271006	480-270374	10/24/2015 11:23	5	TAL BUF	AMH
P:7470A	480-89453-A-4-G MS		480-270525	480-270385	10/22/2015 12:15	1	TAL BUF	TAS
A:7470A	480-89453-A-4-G MS		480-270525	480-270385	10/22/2015 17:11	1	TAL BUF	TAS

Lab ID: 480-89453-4 MSD Client ID: A-01-050815-1600

Sample Date/Time: 05/08/2015 16:00 Received Date/Time: 10/20/2015 09:20

Method	Bottle ID	Run	Analysis Batch	Prep Batch	Date Prepared i Analyzed	Dil	Lab	Analyst
P:3010A	480-89453-A-4-E MSD		480-270880	480-270374	10/22/2015 11:30	1	TAL BUF	KJ1
A:6010C	480-89453-A-4-E MSD		480-270880	480-270374	10/23/2015 20:53	1	TAL BUF	AMH
P 3010A	480-89453-A-4-E MSD ^5		480-271006	480-270374	10/22/2015 11:30	5	TAL BUF	KJ1
A 6010C	480-89453-A-4-E MSD ^5		480-271006	480-270374	10/24/2015 11:26	5	TAL BUF	AMH
P:7470A	480-89453-A-4-H MSD		480-270525	480-270385	10/22/2015 12:15	1	TAL BUF	TAS
A-7470A	480-89453-A-4-H MSD		480-270525	480-270385	10/22/2015 17:14	1	TAL BUF	TAS

TestAmerica Buffalo A = Analytical Method P = Prep Method

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Job Number: 480-89453-1

Client: U.S. Army Construction Engineering Resea

Laboratory Chronicle

Lab ID: 480-89453-4 SD

Client ID: A-01-050815-1600

Sample Date/Time: 05/08/2015 16:00 Received Date/Time 10/20/2015 09:20

Method	Bottle ID	Run	Analysis Batch	Prep Batch	Date Prepared / Analyzed	Dil	Lab	Analyst
P:3010A	480-89453-A-4-C SD ^5		480-270880	480-270374	10/22/2015 11:30	5	TAL BUF	KJ1
A:6010C	480-89453-A-4-C SD ^5		480-270880	480-270374	10/23/2015 20:43	5	TAL BUF	AMH
P-3010A	480-89453-A-4-C PDS		480-270880	480-270374	10/22/2015 11:30	1	TAL BUF	KJ1
A 6010C	480-89453-A-4-C PDS		480-270880	480-270374	10/23/2015 20:47	4	TAL BUF	AMH
P:3010A	480-89453-A-4-C SD ^25		480-271006	480-270374	10/22/2015 11:30	25	TAL BUF	KJ1
A:6010C	480-89453-A-4-C SD ^25		480-271006	480-270374	10/24/2015 11:16	25	TAL BUF	AMH
P 3010A	480-89453-A-4-C PDS ^5		480-271006	480-270374	10/22/2015 11:30	5	TAL BUF	KJ1
A 6010C	480-89453-A-4-C PDS ^5		480-271006	480-270374	10/24/2015 11:19	5	TAL BUF	AMH
P:7470A	480-89453-A-4-F SD ^5		480-270525	480-270385	10/22/2015 12:15	5	TAL BUF	TAS
A 7470A	480-89453-A-4-F SD ^5		480-270525	480-270385	10/22/2015 17:10	5	TAL BUF	TAS

Lab ID: MB

Client ID: N/A

Sample Date/Time: N/A Received Date/Time: N/A

Method	Bottle ID	Run	Analysis Batch	Prep Batch	Date Prepared / Analyzed	Dil	Lab	Analyst
P:3010A	MB 480-270374/2-A		480-270880	480-270374	10/22/2015 11:30	1	TAL BUF	KJ1
A:6010C	MB 480-270374/2-A		480-270880	480-270374	10/23/2015 20:14	1	TAL BUF	AMH
P:3050B	MB 180-159790/1-A		180-159963	180-159790	11/09/2015 12:44	1	TAL PIT	BMH
A:6020A	MB 180-159790/1-A		180-159963	180-159790	11/09/2015 18:46	1	TAL PIT	WTR
P:7470A	MB 480-270385/2-A		480-270525	480-270385	10/22/2015 12:15	1	TAL BUF	TAS
A.7470A	MB 480-270385/2-A		480-270525	480-270385	10/22/2015 16:56	1	TAL BUF	TAS
P.7471B	MB 480-270135/1-A		480-270289	480-270135	10/21/2015 15:00	1	TAL BUF	TAS
A:7471B	MB 480-270135/1-A		480-270289	480-270135	10/21/2015 17:14	1	TAL BUF	TAS

Lab ID: LB2

Client ID: N/A

Sample Date/Time: N/A Received Date/Time: N/A

Method	Bottle ID	Run	Analysis Batch	Prep Batch	Date Prepared / Analyzed	Dil	Lab	Analyst
P:3010A	LB2 480-270052/1-C		480-270880	480-270374	10/22/2015 11:30	4	TAL BUF	KJ1
A:6010C	LB2 480-270052/1-C		480-270880	480-270374	10/23/2015 20:10	1	TAL BUF	AMH
P:7470A	LB2 480-270052/1-E		480-270525	480-270385	10/22/2015 12:15	1	TAL BUF	TAS
A:7470A	LB2 480-270052/1-E		480-270525	480-270385	10/22/2015 16:53	1	TAL BUF	TAS

TestAmerica Buffalo

A = Analytical Method

P = Prep Method

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Job Number: 480-89453-1

Client: U.S. Army Construction Engineering Resea

Laboratory Chronicle

Lab ID: LCS

Client ID: N/A

Sample Date/Time: N/A

Received Date/Time N/A

Method	Bottle ID	Run	Analysis Batch	Prep Batch	Date Prepared / Analyzed	Dil	Lab	Analyst
P:3010A	LCS 480-270374/3-A		480-270880	480-270374	10/22/2015 11:30	1	TAL BUF	KJ1
A:6010C	LCS 480-270374/3-A		480-270880	480-270374	10/23/2015 20:17	1	TAL BUF	AMH
P:3050B	LCS 180-159790/2-A		180-159963	180-159790	11/09/2015 12:44	4	TAL PIT	BMH
A:6020A	LCS 180-159790/2-A		180-159963	180-159790	11/09/2015 18:51	1	TAL PIT	WTR
P:7470A	LCS 480-270385/3-A	-	480-270525	480-270385	10/22/2015 12:15	1	TAL BUF	TAS
A:7470A	LCS 480-270385/3-A		480-270525	480-270385	10/22/2015 16:57	1	TAL BUF	TAS

Lab ID: LCSD

Client ID: N/A

Sample Date/Time: N/A

Received Date/Time: N/A

			Analysis		Date Prepared I			
Method	Bottle ID	Run	Batch	Prep Batch	Analyzed	Dil	Lab	Analyst
P:3050B	LCSD 180-159790/3-A		180-159963	180-159790	11/09/2015 12:44	1	TAL PIT	BMH
A:6020A	LCSD 180-159790/3-A		180-159963	180-159790	11/09/2015 18:56	1	TAL PIT	WTR

Lab ID: LCSSRM

Client ID: N/A

Sample Date/Time: N/A

Received Date/Time: N/A

Method	Bottle ID	Run	Analysis Batch	Prep Batch	Date Prepared / Analyzed	Dil	Lab	Analyst
P:7471B	LCSSRM 480-270135/2-A		480-270289	480-270135	10/21/2015 15:00	1	TAL BUF	TAS
A:7471B	LCSSRM 480-270135/2-A		480-270289	480-270135	10/21/2015 17:18	1	TALBUF	TAS

Lab References:

TAL BUF = TestAmerica Buffalo TAL PIT = TestAmerica Pittsburgh

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A = Analytical Method

P = Prep Method

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REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89453-1

SDG No.:

				Toopont	Parent Reagent	252		
Reagent ID	EMD	Prep	Dilutant Dsed	Final	Reagent ID	Volume Added	Analyte	Concentration
MED SRM D085 00002	10/31/17		EKA, Lot D085-540		(Purchased Readent)	rent)	La.	8760 mg/Kg
							Arsenic	113 mg/Kg
							函	99,1 mg/Kg
							Barium	155 mg/Kg
							n n	109 mg/ kg
							Cadmium	67.5 mg/Kg
							Chromium	164 mg/Kg
							Co	100 mg/Kg
							Cu	100 mg/Kg
							0	15200 mg/Kg
							26	2770 mg/Rg
							Lead	90.1 mg/Kg
							Mercury	8.37 mg/ kg
							No.	27.90 mg/kg
							Pitt	Par / Fill Pag
							No.	68 % may Ret
							M	But An and
							N.	64.5 mg/kg
							90	36 mg/ kg
							Selenium	156 mg/kg
							Silver	52.0 mg/ kg
							SIL	LOW mg/ kg
							\$1 E	86,3 mg/ kg
							1.1	304 mg/kg
							TI.	116 mg/Kg
							>	73 mg/Kg
							12.	168 mg/Kg
MED TCLP 00013	07/31/16	016	Witts Scientific, Lot CM-3291	182	(Eurohased Readent)	rent)	Arsenic	200 ng/mL
i							Berlum	200 aq/mL
							Be	200 ug/mL
							Cadmium	200 ng/mL
							Chromitum	200 ug/mL
							00	200 ng/mL
							CO	250 kg/mL
							Lead	200 ng/mL
							Mrs	200 ng/mF
							Жо	200 ug/mL
							MI	200 ug/mL
							dS	200 ug/mL
							Selenium	200 ug/mt
							Silver	200 ug/mE
							TI	200 ng/mL
							Δ	200 ng/mt.
							Zn	200 ug/mL
MEH HG TCLP W 00073	04/07/18	10/07/15	18 10/07/13 Di Water, Lot Di 680	100 mL N	100 mL MRA SE STR 00003	祖立	100	200000 ng/mL
				2	MEH HG3 STK DDGO6	1,335 mL Mercury	Mercury	1335 ng/mL

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Job No.: 480-89453-1 Lab Name: TestAmerica Buffalo

				ACCOUNT OF	Patent Reagent	i i		
Reagent ID	EMD	Prep	Dilutant Used	Final	Reagent ID	Volume	Analyte	Concentration
.MEA SI STK 00003	(-4)		Ultra Scientific, Lot 1801	90	(Purchased Reagent)	nt)	18	10000 ug/mt
.MEH HG3 STR DCODS			Aqua Solutions, Lot 3073168		(Furchased Reagent)	int)	Mercury	100 mg/L
MEH HG2 WKG 01023	10/22/15	10/21/15	10/21/15 1% ENOS, Lot 3021848	50 mL P	50 mL MEH HG2 INT 00029	0.5 mL	0.5 mL Mercury	100 ng/mL
MEH HG3 SUR DODGS	1 (0)	1/00/07	Agua Solutions, Lot 5073168		(Burchased Readent)		Mercury	100 mg/L
WEN HES WILL STORY	30/00/05	31/00/11	\$100/00/15 TA DAMPS TAT 9051948		a come may con may	O E mi	O E m? Merchry	100 100/100
MEH HG2 TWT 00029	11-	6 10/05/15 1% HMO3.	18 HNO3. Lot 2830814	50 mL P	50 at MRH HG3 SUK DOOD6	S alt	Mercury	10000 ng/mL
MEH HG3 STK CODDS	08/30/16		1.03		(Purchased Reagent)	IU.	Mercuty	100 mg/L
MEI 04 ICV 00286	91/08/10	6 10/12/15	1% HNO3, Lot 2993303	100 mL MEI	Ć.	75 ml		0,375 mg/L
1							Barium	0.375 mg/L
							Cadminn	0.375 mg/L
							Chromium	0.375 mg/L
							Lead	0,375 mg/L
							Silver	0.375 mg/L
.MEI 09 CCV 00200	01/08/16	6 10/05/15	18 HNO3, Lot 2993303	2000 mL P	2000 mL MEI GCV A STR 00009	10 HL	Arsenic	0.5 ug/mL
					1		Barrum	Jm/gn 5.0
							Cadmium	0.5 ug/mL
							Chromium	Jm/sn 5:0
							Lead	0.5 ug/mL
							Selentum	0.5 ug/mL
				4	MEI CCV Ag 00008	Lmt	Silver	0.5 ng/mL
MEI CCV A STR D0009	01/08/10		High-Putity, Lot 1500517		(Burchased Reagent	int)	Arsenic	100 ng/mL
							Barium	100 ug/mL
							Cadini un	100 ug/mt
							Chromitm	100 ug/mL
							Lead	100 ng/mL
00000	0.0000000000000000000000000000000000000						Selentum	TOO REVUIE
MEI CCV AG COCCE			High-Publity, Lot 1420528		(Furchased Reagent)	nt)	SILVEE	TOOO GOVER
MEI 07 ICSA 00080	61/30/17	10/05/15	7 10/02/15 18 HNOS, Lot 2993303	500 cut. N	500 at MEA Al STK 05006.	25 mt	H1	500 ng/mt
				4	MEA Ca STK 00009	25 812	100	Zm/gu 002
				N.	MEA Fe STK 00008	10 mL	(a)	200 ug/mL
				2	MEA MG STK 00007	25 ML	Mg	200 ng/mr
MEA AL STK 00006	-			66B	(Furchased Reagent)	nc)	Al	10000 ng/mT
.MEA Ca STK 00009	-11		Ultra Scientific, Lot T00315	151	(Furchased Reagent)	int)	1 Ca	10000 ng/mL
MEA SE STR BOOKS			Girra Scientific, Lot CM-5098	2000	(Furchased Reagent)	nr)	Q)	
HEA NG STR COCCT	08/T//18	-1	Ultra Scientaile, Lot CM-0429		(Furchased Reagent)	nt)	Mg	10000 rd/mr
MEI 08 ICSAB 00096	12/23/15		07/08/15 1% HNO3, Lot 2833593	1 7m 005	500 mL MEA AG STK 00003	0.1 mL	0.1 mL Silver	0.2 ug/mL
				4	MEAS STR COOLS	0.05 mL Sulfut	Sulfut	1 wg/mF
				2.	KEI ICSAB STK 00019	20 ml	A1	500 .6 ug/mL
							Arsenic	9.1 ug/mp
							Barlim	0,5 ug/mL
							i m	0.5 ng/mL
							1177	Tarker C. Cook
							Chronium	Jm/pn 2.0
				Page 43 of 166	f 166			11/11/2015
				,				

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89453-1

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Reagent ID	DXG							
	Date	Prep	Dilutant	Final	Reagent ID	Volume Added	Analyte	Concentration
							60	0.5 ug/mt
							577	0.5 ug/mL
							Vie.	100 ug/mL
							Lead	0.05 ng/mL
							Li	0,5 ug/mL
							No	300.e ng/mL
							MA SE	0.5 Ng/mL
							175	0.6 nevmt
							Selenium	0.05 ug/mL
							Si	l ug/mL
							M to	0,5 ug/mL
							7.1	Jm/gu I.o
							× 52	1 wer/ml.
MEA AG STK 00003	05/31/16		Witra Scientific, Lot K00335	333	(Purchased Reagent)	£3	Silver	1000 ng/ml.
	12/23/15		High Purity, Lot 1326810	0	(Furchased Reagent)	(2)	Sulfut	10000 mg/mL
MEI ICSAB STK 00019	01/31/16		Ultra Scientific, Lot CL-5319	319	(Purchased Reagent)	(t)	AI	2006 ug/mL
							Arsenic	Ing/mr
							Barium	Jm/mr
							Вe	S ng/mr
							Ca	\$005 ug/mL
							Cadmium	10 ng/mt
							Chromium	Jm/gw 3
							Co	5 ug/mL
							cn	5 ng/mt
							D E	TOOO REVIEW
							Pead	O.S LIGVIEL
							41	BOOK SOUTH
							PL Mrs	South ag/ml.
								To vorint.
							Sb	Tu/mr
							Selenium	0.5 ug/mL
							TE .	10 ng/mL
							17.00	nd/mr
							11	I ng/mL
							Λ	5 ug/mL
							20.	10 ug/mL
MEI 09 CCV 00200	91/99/10	6 10/05/15	1% HNOS, Lot 2993993	3000 mL	3000 mL MEI CCV A STE 00009	10 mc	200	0.5 ug/mL
							Bartum	Jm/\mu 8.6
							Cacimitum	0.5 Ng/mL
							Chromitum	0.5 ug/mL
							Lead	0,5 kg/mL
							Selenium	O.S ug/mL
					MRI CCV AG 09008	Tun I	Silver	0.5 ng/mL
MEI CCV A STE DOOD9	91/30/10		High-Purity, Lot 1500517		(Forchased Reagen		Arsenic	Two nd/wr

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89453-1

Fig. 12 CV Ag 00000					Washington W	Patent Reagent	2		
09/17/17	Reagent ID	EMD	Prep	Dilutant Used	Final	Reagent ID	Volume	Analyte	Concentration
09/17/17								Barium	100 ag/mt
OFFICE O								Cadmium	100 ng/mL
09/17/17 High-Purity, Lot 1420628 CBurchased Reagenth Statentum Stat								Chromium	100 ug/mL
09/17/17 High-Purity, Lot 1420628 CPurchased Reagenth Silver Condition Conditi								Lead	Ind ug/mL
09/17/17								Selenium	100 ug/mL
01/24/16 10/20/15 14 HR03, Lot 3033697 2000 mL MEI_CRI STRZ_00007 20 mL Arsentc Cedmium Lead	.MEI CCV Ag 00008	71/71/60		High-Purity, Lot 1420628		(Purchased Read	ent)	Silver	1000 ng/mt
PART CAR STOCK 00019 20 mL Arsentch	MEI 10 CCVL 00082	01/24/16	10/20/15	1% HNO3, Lot 3033467	2000 mL	MEI CEI STHO DOOD7	10 mL		0,015 mg/L
Part								Caclmium	0,002 mg/L
NEI CRI STOCK 00019 20 m								Lead	0.01 mg/L
NEI CRI STOCK 00019 20 mi Areanic Eartum								Selenium	0,025 mg/L
Mai CRI STOCK GOODS 20 mL Assentc 20 mL									0,006 mg/L
01/24/16 09/21/15 6'84503 5'845Ct, Lot 1000 mL REA_AS_STK_00003 0.05 mL Average Chromtum Cadmium Chromtum Cadmium Chromtum Cadmium Cadmi						MEI CRI STOCK 00019	20 m2		0.015 mg/L
Character Char								Barlum	0.002 mg/L
1/24/16 09/21/15 64ENO3 5%BCL, Lot 1000 nL KEA_AS_STK_00003								Cadmium	0.002 mg/L
Di/24/16 09/21/15 69HD03 5NHCL, Lot L000 mL NEA_AS_STK_00003 0.05 mL Arsenic								Chramium	0,004 mg/L
91/24/16 09/21/15 69ED03 59ECL, Lot 1000 mL MEA_AS_STK_00003								Lead	0.01 mg/L
01/24/16 09/21/15 64ED03 59ECF, Lot 1800 mL MEA_AS_STK_00003 0.05 mL Leadnum MEA_RS_STK_00003 0.05 mL cadnuum MEA_RS_STK_00004 0.15 mL cadnuum MEA_RS_STK_00006 0.15 mL cadnuum MEA_RS_STK_00006 0.15 mL cadnuum MEA_RS_STK_00006 0.15 mL cadnuum MEA_RS_STK_00006 0.05 mL cadnuum MEA_RS_STK_00006 0.05 mL cadnuum MEA_RS_STK_00006 0.05 mL cadnuum MEA_RS_STK_00006 0.05 mL cadnuum MEA_RS_STK_00003 0.15 mL cadnuum MEA_RS_STK_00003 0.15 mL cadnuum MEA_RS_STK_00003 0.15 mL cadnuum MEA_RS_STK_00003 0.05 mL cadnuu								Selenium	0,025 mg/L
D1/24/16 09/21/15 6%HD03 5%HCV, Lot 1000 mL MEA_RS_TK_00003								Silver	0,006 mg/L
05/25/18 Ultra Scientific, Lot T00590 NEA FE STK 00006 0.05 mL Lead	.MEI CRI STX2 00007	01/24/16	09/21/15		1000 mL	MEA AS STK 00003	0,05 mL		0.5 ug/mt
NEA GG STK 00003 0.05 mL Cadmium				2487631					
NEA PS STK 00006 0.05 mL Lead						MEA CG STK 00003	0.01 mL	Cadmium	O.1 ug/mL
NEA SE STK 00004						MEA PB STK 00006	0.05 mL	Lead	Jm/6n 6.0
05/25/18 Ultra Scientific, Lot T00590 (Furchased Reagent) Arsenic Centum						MEA Se STK 00004	0.1 mL	Selenium	1 ng/mr
05/25/18 Ultra Scientific, Lot 100590 (Purchased Reagent) Arcenic Cadmium 06/25/15 Ultra Scientific, Lot 100661 (Purchased Reagent) Cadmium 06/25/17 Ultra Scientific, Lot 2012 1000 mL MEA (Strohased Reagent) Selentum Selentum California						MEI CCV Ag 00007	0.3 mL		0.3 ug/mL
01/24/16 Ultra Scientific, Lot 100306 (Purchased Reagent) Lead	MEA AS STK 00003	05/25/18		tra Scientific, Lot 7005	90	(Furchased Reagn	ent)	Arsenic	10000 ng/mL
1/01/16	MEA CG STK 00003	01/24/16		tra Scientific, Lot 1004	9.0	(Furchased Reage	ent)	Cadmium	10000 ng/mL
11/02/16 Ultra Scientific, Lot PUID05 (Purchased Reagent) Setentium 11/02/16 Ultra Scientific, Lot PUID05 (Purchased Reagent) Silver Ultra Scientific, Lot T00590 Ultra Scientific, Lot T00590 Ultra Scientific, Lot T00590 Ultra Scientific, Lot T00590 Ultra Scientific, Lot L00006 Ultra Scientific, Lot Ultra Scientific, Lot L00006 Ultra Scientifi	MEA PB STE DOGGE	06/25/17		rea Scientific, Lot Mone.	1.1	(Purchased Read	ent)	Lead	10000 ng/mL
01/24/16 09/22/15	MEA Se STK 00004	11/01/16		tra Scientific, Lot BUID	570	(Furchased Reads	ent)	Selenium	10000 nd/mr
19 01/24/16 09/22/15 69HBN03 59HCL, Lot 222 1000 mL MRA AS STK 00003 0.1 mL Atsentc MRA BS STK 00004 0.05 mL Battum MRA CG STK 00003 0.01 mL Cadmium MRA CG STK 00003 0.01 mL Cadmium MRA CG STK 00003 0.00 mL Lead cannium MRA CG STK 00003 0.04 mL Chromium MRA CS STK 00005 0.05 mL Lead MRA SE STK 00005 0.05 mL Lead CANNIUM MRA SE STK 00007 0.15 mL Stead MRA SE STK 00007 0.1 mL Stead MRA SE STK 00007 0.3 mL Silver O1/10/17 Ultra Scientific, Lot 100406 (Purchased Reagent) Battum MRA COLONIUM (Purchased Reagent) Chromium 05/25/18 Ultra Scientific, Lot M00611 (Purchased Reagent) Chromium 05/25/18 Ultra Scientific, Lot M00611 (Purchased Reagent) Chromium 05/25/18 Ultra Scientific, Lot M00611 (Purchased Reagent) Silver O3/25/18 Ultra Scientific,	MEI CCV Ag 00007	03/25/18		Ultra, Lot M00474		(Purchased Read	ept)	Silver	1000 ng/mL
NEA 36 STK 00004 0.02 mL Barrum NEA 36 STK 00004 0.02 mL Barrum NEA cd STK 00005 0.01 mL Cadmium NEA Cd STK 00005 0.04 mL Chrontum NEA PE STK 00005 0.04 mL Chrontum NEA PE STK 00006 0.05 mL Lead 0.07 LOT 0.04 mL Chrontum NEA STK 00007 0.03 mL Silver 0.07 LOT 0.04 mL Chrontum 0.04 LOT 0.04 mL Chr	, MEI CRI STOCK DO019		09/22/15	6%HNO3 5%HCL, Lot 222	1000 mL		0.1.mL	Atsenic	1 ng/mr
NEA CE STK 00003						NEA Ba STK 00004	0,02 mL		0.2 ug/mL
NEA CE STR 00003						MEA Cd STK 00003	0.01 mt		O.1 ng/ml
NEA PS STK 00006						MEA CE STR UDDOS	0.04 mL		O.4 ng/mL
NEA See STK 00004						MEA PB STK 00006	0,05 mL		D.5 ug/mL
05/25/18 Ultra Scientific, Det T00591 (Purchased Reagent) Aisenic						MEA Se STK 00004	0,15 ml	Selenium	l.S ug/mt.
05/25/18 Ultra Scientific, bot 700590 (Purchased Reagent) Azsenic 07/10/17 Ultra Scientific, Lot L00000 (Purchased Reagent) Bartum. 01/4/16 Ultra Scientific, Lot C00000 (Purchased Reagent) Chromium 05/25/18 Ultra Scientific, Lot M00611 (Purchased Reagent) Chromium 06/25/17 Ultra Scientific, Lot M00611 (Purchased Reagent) Lead Lot M00611 Lot M00611 (Purchased Reagent) Selentum 03/25/18 Ultra Scientific, Lot M00614 (Purchased Reagent) Selentum 03/25/18 Ultra Lot M00614 (Purchased Reagent) Selentum 03/25/18 Ultra, Lot M00616 (Purchased Reagent) Selentum 03/25/18 Ultra, Lot M006174 (Purchased Reagent) Selentum 03/25/18 Ultra, Lot M006174 Ultra Lot M006174						MEI CCV Ag 09007	0.3 mL		0,3 ug/mL
07/10/17 Ultra Solentific, Lot L001492 (Furchased Reagent) Barkum 07/25/18 Ultra Solentific, Lot L00405 (Purchased Reagent) Cadmium 05/25/18 Ultra Solentific, Lot A00406 (Purchased Reagent) Chromium 06/25/17 Ultra Solentific, Lot M00611 (Purchased Reagent) Lead Liff(A116 Ultra Solentific, Lot M00611 (Purchased Reagent) Lead Calmium 03/25/18 Ultra Solentific, Lot M00614 (Purchased Reagent) Selentum O3/25/18 Ultra, Lot M00616 (Purchased Reagent) Selentum O3/25/18 Ultra, Lot M00616 (Purchased Reagent) Silver	MEA AS STK DGGG3	05/25/18			90	(Furchased Reagn	ent)	Arsenic	10000 ng/mL
01/24/16 Ultra Scientific, Lot L00406 (Purchased Reagent) Cadmium 05/25/18 Ultra Scientific, Lot ol-304 (Purchased Reagent) Chromium 06/25/17 Ultra Scientific, Lot N00611 (Purchased Reagent) Lead 11/01/16 Ultra Scientific, Lot 201005 (Purchased Reagent) Silenium 03/25/18 Ultra, Lot M00474 (Purchased Reagent) Silver	MEA Ba STK 00004	71/01/10			53	(Furchased Reage	ent)	Barium	10000 ng/mr
05/25/18 Ultra Scientific, Lot 21-4304 (Purchased Reagent) Chromium 06/25/17 Ultra Scientific, Lot 201005 (Purchased Reagent) 1404/16 Ultra Scientific, Lot 201005 11/01/16 Ultra Scientific, Lot 201005 (Purchased Reagent) Selenium 03/25/18 Ultra, Lot MO0474 (Purchased Reagent) Silver	MEA CG STR 00003	01/24/16		tra Scientific, Lot L004	96	(Purchased Read	ent)	Cadmium	10000 ng/mL
06/25/17 Mira Scientific, Lot 200611 (Purchased Reagent) Lead Lilra Scientific, Lot 201005 (Furchased Reagent) Scientific Ultra Scientific, Lot 201005 (Purchased Reagent) Scientific Ultra, Lot MO0474 (Purchased Reagent) Stilver St	MEA CT STR 00003	05/25/18		tra Scientific, Lot cl-43	500	(Purchased Reage	ent)	Chromium	10000 ug/mL
11/01/16 Ultra Scientific, Lot 201005 (Furchased Reagent) Selenium 03/25/18 Ultra, Lot M00474 (Surchased Reagent) Silver	MEA PB STR 00006	06/25/17	Tu	tra Screntafic, Lot M006	1.1	(Purchased Read	ent)	Cend	10000 ug/mL
03/25/18 Ultra, Lot M00474 (Purchased Reagent) Silver	MEA SE STK 00004			tra Scientific, Lot 2010	99	(Furchased Reagn	ent)	Selenium	10000 ng/mL
	MEI CCV Ag 00007	03/25/18		Ultra, Lot M00474		(Surchased Read	ent)	Silver	1000 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Pitusburgh Jop No.: 480-89453-1

Nelume	12/31/15 11/09/15 27 27 27 27 27 27 27 2					Hearing	THE PARTY STREET	-		
12/31/15 11/09/15 12/31/15 12/31/15	13/32/14 13/94/15 29 Hittir Acid, Lor 350 mt WALESPROANS 20004 10 mt Accents 10 mt	Reagent ID	Exp	Prep	Dilutant	Final	Reagent ID	Volume	Analyte	Concentration
1241747 12417477 1241747 1241747 1241747 1241747 1241747 1241747 1241747 1241747 1241747 1241747 1241747 1241747 1241747 1241747 1241747 1241747 1241747 1241747 12417477 124	1291747 1291747 1291747 1291747 1291747 1291747 12724715 1272	MCCVIX 00082	12/31/15	11/09/18	2% Nitric Acid,	200 mL	MCALSEECAREV 30006	10 ml A	Arsenic	0.1 ppd
12/30/16 Thispiganic Ventures, Let 72-96857553	The property The)							The state of the s	
12/30/16 Thirpganic Ventures, Lot 72-96857553 Churchaed Respent)	12/30/16 Thorganic Vantures, Lot 72-958575123 CFLTC)ased Respent Early							<u>m</u> [Sarium	0.1 ppm
12/30/14 Thirtgaint Vertures, Let 32-825/5123 Chirchaeed Reagent Recture Chicatum Silver Chicatum Silver Chicatum Silver Chicatum	12/30/15 Thitgamic Variation, 12/31/15 Thitgamic Variation, 12/31/15 Thitgamic Variation, 12/31/15 Thitgamic Variation, 12/31/15 Thitgamic Variation, 100 mL Modelland Respect 100 mL Modelland Respect 100 mL Modelland Respect 10							2 0	admilin	edd Tro
Signature Sign	Month Mont							3	ant outside	Mad L.D
12/30/15 11/06/15 11000000 12/30/15 11/06/15	12/30/16 Thorpganic Ventures, Lot 12-MES 575123 (Furchased Respent) Allerian Silver							1 31	Diam'r.	20 Dog
12/30/15 Thorganic Ventures, Lot 32-MEB575133 (Furchased Reagent) Ricented Education Continue Co	25/30/16 Thoroganic Ventures, Lot 32-MEB\$75123 (Furchased Reagent) Alver Alver							(O	Selenium	0.1 ppu
12/30/16 Thorganic Variates, Lot 32-MEB575133 (Eurchased Reagent) Riesanic Barting Chicatum	12/30/15 11/06/15 110/09/15 11/06/15 11/06/15 11/09/15 11/06/15	The contract of the last			The second second second second	K			Hivet	0.1 ppm
12/30/15 11/06/15 18003, Lot 1191061 250 mL MARCAL-18_00005 1 mL Accentum Chadman Ch	12/30/15 11/05/15 HNOS, Lot 159108		06/01/16	Inorga	anic Ventures, Lot 12-ME	CB 575 L03	(Purchased Reag		Arsenic	ndd S
12/30/15 11/05/15 14003, Lot 1191051 250 mL MARCAL-1B_00005. Ind Arcentary 12 can take the control of the control	12/30/15 11/05/15 1803, Lot 1191001 250 mL MARCAL-1B_00005 Ledd Macental Engine 12/31/16 Lincipante Venturee, Lot 42-ME5972092 (Tairchased Reagent) Reference 12/31/15 11/09/15 28 Mirrie Acid, Lot 100 mL M6020105-0M 20006 10 mL M1987 Macental Engine 12/31/15 11/09/15 28 Mirrie Acid, Lot 100 mL M6020105-0M 20006 10 mL M1987 Macental Engine 12/31/15 11/09/15 28 Mirrie Acid, Lot 100 mL M6020105-0M 20006 10 mL M1981 Macental Engine 12/31/15 11/09/15 Acid, Lot 100 mL M6020105-0M 20006 10 mL M1981 Macental Engine 12/31/15 11/09/15 Macental Engine M6020105-0M 20006 10 mL M1981 Macental Engine M1981 M198							ш	Sarium	udd G.
12/30/15 11/06/15 1803; Lot 1391081 250 mL MRSCRI-1E_00005 1 mL Resented	12/30/15 11/06/15 1903, Lot 1191081 250 mL MNRCRI-18_00005. 1 mL MRCRI-18_00005. 1 mL MRCRI-18_0005. 1 mL MRCRI-18_005. 1 mL MRCRI-							٥	Jadmium	ndd S
12/30/15 11/06/15 14803, Lot 1291081 250 mL MMSCRI-1B_00005.	12/30/15 11/06/15 1803, Lot 1191091 250 mL MRCRI-1E_00005 Lot 22-MEB072092 Counting Silver Si								Chromium	ngg c
12/30/15 11/05/15	12/30/15 11/06/15 HNO3, Lot 1291091 250 mL MNSCRI-1E 00005 1 mL Arsenta							64 (2	Jean	ndg 6
12/30/15 11/06/15 HNO3, Lot 1591081 250 cm MARCAT-18,00005 1 cm Aresented Salayar	12/30/15 11/05/15 14033, Lot 1391881 250 mL KNBCRI-18_00005 1 mL Agrestic Ending to Chromium Salver Ending Ending to Chromium Ending							N	(6)	7800 0067
12/30/15 11/06/15 HN03, Lot 1191081 250 mL MM8031-1B_00005 1 mL Azzenta 12/31/16 Inorganic Vantures, Lot J2-MFB572092 (Eutripased Reagent) Azzenta Chromium Cadmium Cadm	12/30/15 11/786/15 HMO3, Lot 1191381 250 mL MM8C3I-1B_00005. I mL Azsenic Codmitten Co							a o	or entum	ndd c
12/30/15 11/06/15 HNOS, Lot 1191081 250 mL MXECKI-1B_00005 Intl Assentation Characteristic Market Characterist	12/30/15 11/06/15 HNO3, Lot 1191081 250 mL MMSCRI-1B_00005; Inflatence Condition Silver Condition Condition Silver Condition Con							0	TAKET	2000
12/31/15 Inorganic Vantures, Lot 42-MEB572092 (Eurohassed Reagent) Selentum Control tun Co	12/31/16 Inorganic Vartures, Lot 32-AGB572092 (Eurstased Reagent) Restriction of the containing the conta	MCRIX 00075	12/30/15	11/90/12	HNO3, Lot 1191881	250 mL	MMSCRI-1B 00005	Lun A	Arsenic	0,001 ppn
12/31/16 Inorganic Ventures, Lot 42-MEB572092 (Eurohased Reagent) Gradium Condition Condit	12/31/16 Inorganic Ventures, Lot J2-MEB572092 (Eurokased Reagent) Silver Chicohium Chicohi							m	Sarium.	0.01 ppn
12/31/16 Inctganic Ventures, Lot 42-MERS72092 (Eurchased Reagent) Chromium Chrom	100 ml 1							0	admium	ndd 100'0
Calculation	12/31/16 Inceganic Ventures, Lot 42-MEB572092 (Eurmhased Reagent) Silver Risenac								hromium	0,002 ppn
12/31/16 Inorganic Ventures, Lot 42-MES572092 (Turchased Reagent) Sidentum Sidentum Sidentum Cachium Cachium Chrontum Cachium	Silver S							67	ead	100.00 pp
12/31/15 11/09/15 28 Mirric Acid, Lot 100 mL Mc0201CS-0A D00D6. IO mL ALSenic Month of Calmium Salver Month of Month of Month of Month of Month of Month of Calmium Manual Calmium Calmium Calmium Calmium Calmium Calmium Calmium Calmium Manual Man	12/31/15 Inorganic Ventures, Lot 42-MEB52092		1					in	Selenium	0,005 ppm
12/31/15 11/09/15 28 Mirric Acid, Lot	12/31/15 11/09/15 28 Nirric Acid, Lot 100 mL M6020ICS-0A 00006 IO mL AI Arsentc Cadmium Cadmium Cadmium Cadmium Cadmium Cadmium Laad Selentum Cadmium Cadmium Cadmium Cadmium Cadmium Cadmium Cadmium My My My Mo Mo Cadmium Mium Mium Mium Mium Mium Mium Mium								liver	0.001 ppg
12/31/15 11/09/15 20 Nitil Reid, Lot 100 mL M6020ICS-0A_00006.	12/31/15 11/09/15 28 Mirric Acid, Lot 100 mL Me020LCS-OA_000D6	.MMSCRI-18 GOODS	04/01/16	Inorde	unic Ventures, Lot J2-ME	3872092	(Eurohased Read		Insent	0.25 ppg
12/31/15 11/09/15 28 Matric Acid, Lot	12/31/15 11/09/15 2* Mirric Acid, Lot 100 mL M60201CS-0A_00006. 10 mL Al Cachium Character Balance State from the M60201CS-0A_00006. 10 mL Al Cachium Character Balance Balanc							m)	Satium	2.5 ppn
12/31/15 2% Mittic Acid, Lot 100 mL M60201CS-0A D0006. IO mL All Fe R R M9 Mo M60201CS-0B 00007 I mL Atsenic Cardinum Chromium M1	12/31/15 2% Mixic Acid, Lot 100 mL M6020ICS-DA_D0006. 10 mL Al							O	Cadmium	0.25 ppn
12/31/15 11/09/15 28 Mirric Acid, Lot 100 mL M60201CS-0A_D00D6. 10 mL Al Selection	12/31/15 11/09/15 28 Nitric Acid, Lot 100 mL M6020ICS-0A D00D6 IO mL Al Selection Silver Ee Ee Ee Ee Ee Ee Ee							E)	thromium.	0.5 ppn
12/31/15 11/09/15 28 Nirric Acid, Lot. 100 mL M6020ICS-0A D0006. 10 mL Al Ca E E E E E E E E E E E E E E E E E E	12/31/15 11/09/15 28 Mixic Acid, Lot 100 mL M60201CS-DA_D0006. 10 mL Al Ca FF							1-3	ead	0.25 ppm
12/31/15 11/09/15 28 Nitric Acid, Lot 100 mL M60201CS-0A D00D6 10 mL Al	12/31/15 11/09/15 28 Nitric Acid, Lot 100 mL M6020ICS-0A D0006. IO mL Al Es R R R M9 M0							DO .	Selentum	1.25 ppu
12/31/15 11/09/15 28 Mirric Acid, Lot 100 mL M60201CS-0A_D0006 10 mL Al Ca Fe	12/31/15 11/09/15 28 Mirric Acid, Lot 100 mL M6020ICS-0A_D0006 10 mL Al Ca Fe							on.	Silver	0.25 ppn
Ca Fe Fe Fe Fe Fe Fe Fe F	Ca Fe Fe Fe Fe Fe Fe Fe F	MICSABL 00078	12/31/15	11/00/12	28 Nitric Acid,	100 mL	M6020ICS-0A D00D6.	IO ME A	11	100 ppm
Fe F	S-08_00007 1 mi. Arsenic Codmium Co Cal				U38N82			10		CCC
R R M9	S-03_00007 I mi Arsenic Cadmium Coronium Coronium Coronium Coronium Nam							2 6	0 6	BON COL
My My Mo	MG MG MG MG MG MG MG MG							ia ji	D	and out
I mi Areanto Chombun Chrontum Co Cu Ma	S-08_00007 1 mi. Arsenic Codmium Co. Cal							4)2		night con
Wil	S-03_00007 1 mi Arsenic Cadmium Chromium Co Ma							6 2	2)	Wild Co.
I ml Arsentc Ceantum Carontum Co Co Co Co Co No No No	S-03_00007							E 2	40.	udd 2
I mi. Atsenic Casminin Casminin Co Co Cu Mi.	S-08_00007 1 ml Arenic Cedmium Cromium Ca Cu Nu							4,18		Ton bed
I Wh. Areant.c. Cadmitten Character Co. Ca	S-03_00007 Int. Arsenic Commun Co. Con Int. Co. Mr. Mr.							\rightarrow		bild 7
The facts	Co-direction Control Line Control Control Mon						M60201CS-0B 00007		Arsenic	0.02 ppg
LOW LUM	NA. Man							인	admium	0.02 ppm
	Co. 700 N1							PJ	Thromatim	0,02 pps
	(C12 (M)							0	07	0.02 ppm
	MO; N.								я	0.02 ppn
	N1							RI J	(III	0,022 ppm
								N.	11	0.02 ppm

Job No.: 48D-89453-1

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Note					4 management	Patent Reagent	12		
Silver Street S	Reayent ID	EMP	Prep	Dilutant	Final	Reagent ID	Volume Added	Analyte	Concentration
WASTERARY-LONDON								Silver	0.02 ppm
RMSTCSAB-1_09098 0.7 decision								1 L L	0.025 ppm
Section Sect						MMCTCSAR-T DOORS	M. S. m.		20 CO CO
Seed							4		O D D mem
Particle								77	med 40.0
12/31/15 11/09/15 DI WARPE, LOT J2-MER575126 (Furchased Reagent) 10 ml 10								Lead	0.02 ppm
11 12/31/15 11/09/15 DI WARFET LOC 135-ME5/35126 (Surchased Reagent) 12/31/15 11/09/15 DI WARFET LOC 135-ME5/35126 (Surchased Reagent) 12/31/15 11/09/15 DI WARFET LOC 135-ME5/35126 (Surchased Reagent) 12/31/15 DI WARFET LOC 135-ME5/35126 (Surchased Reagent) 13/47 DI WARFET LOC 135-ME5/35126 DI WARFET								000	0.025 ppm
PRESTICES 2-2,000077 S1.2 mL PERSTICES 3-2,000077 S1.2 mL								7.1	0.02 ppm
WASTICEAR - 0,0007								_	0.02 ppm
200002 01/26/18 Indeptatic Vertures, Lot 32-92853311 (Sutchased Respent) Statestum						MMSICSAB-2 00007	J. S. M.		0.05 ppm
17/26/16 Inorganic Ventures, Lot 32-9EB53111 (Eurchased Reagent) Sin S								SD	0.02 ppm
ODDOG OL/26/18 Inocquaric Venturee, Lot 72-MEB53311 (Eutchased Reagemt) All								Selenium	mgg 50.0
200002 01/26/18								10	0.5 ppm
00006 01/26/18 Independent No. 72-MEB53311 (Eurchased Reagent) No. 72-MEB53311 (Eurchased Reagent) No. 77-MEB53311 (Eurchased Reagent) No. 77-MEB53311 No. 72-MEB53311 (Eurchased Reagent) No. 77-MEB53312 (Eurchased Reag	A CONTRACTOR OF THE PARTY OF TH							Sn	0.1 ppm
100001 01/26/18 Inorganic Vertures, Lot 32-MEB59107 (Purchased Reagent) No. 10000 12/31/16 Inorganic Vertures, Lot 32-MEB59126 (Purchased Reagent) Eather 10000 12/31/16 Inorganic Vertures, Lot 32-MEB59126 (Purchased Reagent) Eather 10000 12/31/16 Inorganic Vertures, Lot 32-MEB59126 (Purchased Reagent) Eather 12/31/16 11/09/16 DI Water, Lot 32-MEB59126 (Purchased Reagent) Eather 12/31/16 11/09/16 DI Water, Lot 32-MEB59126 (Purchased Reagent) Eather 12/31/16 11/09/16 DI Water, Lot 32-MEB59126 (Purchased Reagent) Eather 12/31/16 11/09/16 DI Water, Lot 38H82 100 mL H60201CS-0A_00006 100 mL H1 M99 M99 M90	.M602010S-0A 000008	01/26/18	Inone	yanic Ventures, Lot J2-MB	(B533111	(Burchased Reag	ent)	AI	1000 ppm
00007 01/26/16 Inorganic Ventures, Lot 32-MEB59107 (Purchased Reagent) Ne								Ca	mdd 0001
12/31/15 11/09/15 Dr Warer, Lot J2-MEB575126 Parchased Reagent) Pace								Fe	1000 ppm.
Mile								ten	1000 ppm
No.								- N	1000 ppm
100007 01/26/18 Inorganic Ventures, lot 32-NEB559107 (Purchased Reagent) Nin N								54	more once
12/31/15 11/09/15 DI Water, Lot J2-MEB575126 (Purchased Reagent) Arestace Ar								M.C.	1000
00007 01/26/18 Inorganic Ventures, Lot 32-NEB559107 (Purchased Reagent) Areanic Contourn Column Colu								E STATE OF THE STA	mdd 0001
00007 01/26/18 Inorganic Ventures, Lot 32-MEB575125 (Purchased Reagent) Area Commun Chromium Chromi	The second second second second	Annual State of State				The second second		Ti	20 ppm
12/31/15 11/09/15 DI Water, Lot J2-WEB575126 (Furchased Reagent) Silver Cadmium Chromium Chrom	.MG0Z0ICS-0B 00007	01/26/18	Inord	Manic Ventures, Lot J2-Mi	T016283	(Purchased Read	ent)	Arsenic	2 ppm
12/31/15 11/09/15 Dr Water, Lot J2-WEB575126 (Purchased Reagent) Emiliar Chromium Chr	1							Cadminn	2 000
12/31/15 11/09/15 DI Water, Lot J2-MEB575126 (Purchased Reagent) Estimated Continued Con								20,400	The second
00008								C)	model of
National Contract								000	med 2
Man Mi Mi Mi Mi Mi Mi Mi M								Cn	mdd 7
Silver S								Mn	Z.2 ppm
Silver S								Ni	2 ppm
06/01/16 Inorganic Ventures, Lot J2-MEB575126 (Furchased Reagent) Estimm Lead Lead Lead Sz								Silver	2 ppm
00009 06/01/16 Inorganic Ventures, Lot J2-MEB575125 (Furchased Reagent)	the second secon		1					112	2.5 ppm
12/31/15 11/09/15 DI Water, Lot J2-MEB575126 (Furchased Reagent) EB T1 T2 T3 T3 T4 T4 T4 T4 T5 T4 T5 T4 T5 T5	.MMSICSAB-1 000008	06/01/16	Inore	manic Ventures, Lot J2-MB	3B575125	(Furchased Read	ent)	Barrinn	10 ppm
Lead Sz Ti Thorganic Ventutes, Lot J2-MEB575126 (Furchased Reagent) W V V V V V V V V V								di di	mad of
171 T1 T7 T7 T7 T7 T7 T7								Cit da	TO nom
06/01/16 Inorganic Ventures, Lot J2-MEB575126 (Furthased Reagent) V V Selentum Si Selentum Si Sin Sin Sin Sin Sin Sin Sin Sin Sin								11 11 12 14 15	10 5 200
06/01/16 Inorganic Ventures, Lot J2-MEB575126 (Furchased Reagent)								F	made or at
12/31/15 11/09/15 DI Water, Lot J2-WEB575126 (Furchased Reagent) E SED								77	10 200
12/31/15 11/09/15 DI Water, Lot J38N32 100 mL M6020ICS-0A_00006 10 mL Al Se	TODOO T. GOOD T.	STITE STATE	There	The same of the sa	CONTROL OF	Prop Proprieta	1400		1000 O T
12/31/15 11/09/15 DI Water, Lot J38N32 100 mL M6020ICS-0A_00006 10 mL A1 Ee Ee R Mg Mg MG MA MA MG	10000 2 gwg at simi.	07/70/00	STORT	denic ventures, not at a	100 to 100 to	head possessing)	int'	n io	mind of
12/31/15 11/09/15 DI Water, Lot J38N82 100 mL N60202CS-0A_00006. 10 mL Al Ee R R R N9 N9 Page 47 of 166								200	IIIGA AT
12/31/15 11/09/15 DI Water, Lot J38182 100 mL N60202CS-0A_00006. 10 mL Al Es Fr Fr Mg Mg Mg M7								Sea Chara	40 000
12/31/15 11/09/15 DI Warer, Lor J38H82 100 mL N6020ICS-0A D0006 10 mL R1 Ca F F N Mg N0 N0 N1/11								10	100 ppm
12/31/15 11/09/15 DI Water, Lot J38H82 100 mL M6020ICS-0A_00006 10 mL All Reserved to the Rese								Sh.	mad ng
Ca Ee E E E E E E E E	MICSAI 00074	12/31/15	17/00/11	5 DI Water, Lot J38N82	100 mL	M60201CS-0A 00006	10 mil		100 ppm
章 医								90	100 ppm
ж Мо Мо								GI	100 mag
Mg Mo								bit	100 com
Mo.								W	100 001
11/11/20								No.	## ### ### ### #######################
								100	MAIN =
					Page 47	of 166			11/11/2015

REAGENT TRACEABILITY SUMMARY

Job No.: 480-89453-1 Lab Name: TestAmerica Pittsburgh

SDG No.:

Page					- tugerous	Parent Reagent	THE.		
11/30/16 Indeposity Ventures, Lot 32-MER533111 (Eurchaeed Neagent) The continue of the c	Reagent ID	EMp	Prep Date	Dilutant	Final	Reagent ID	Volume	Analyte	Concentration
11/30/16 Inorganic Ventures, Lot 32-MERS13111 (Entchased Reagent) Tri								Na	100 ppm
11/30/16 Indepositic Ventures, Lot 32-MEB513111 (Fatchesed Reagent) All Richaesed Reagent)								Ti	Z ppm
11/30/16 10/25/18 28 Hittle Acid, Lor 250 mg/L RICPMSICV_DOOJS 10 mg/L Attended Respent 11/30/15 10/25/18 28 Hittle Acid, Lor 250 mg/L RICPMSICV_DOOJS 10 mg/L Attended Respent 12/31/15 11/30/15	M6020ICS-0A 000006	01/26/18	Inordan	Ventures, Lot	8533111	(Purchased Reag	(ent)	A1	1000 ppm
11/30/15 10/23/15 2% Mittato Acid, Lot 250 mg/L MICPMSICY_OROUS 16 mg/L MicroMSICY_OROUS 17/23/15 11/30/15 11/								CA:	1000 ppm
11/30/15 10/25/15 25 Hittle Acid, Lor 250 mg/L RICPNSICV_COOLS 10 mg/L Areas 10 mg/L								- FE	1000 ppm
11/30/15 10/23/15 28 Nititic Acid, Lot 250 mg/L Microsoft Seegent 16 Arsenic 0 0 0 0 0 0 0 0 0								56	1000 ppm
11/30/15 10/23/15 28 NILLIC Acid, Lot 250 mg/L NICPNSTCY_COOLS 10 mg/L Arestic 0								Mg	1000 ppm
11/30/15 10/33/15 28 Mittic Acid, Lor								No	mad 02
11/30/15 10/23/15 28 Milter Acid, Lor								Ti	20 ppm
25206 2520	MICVX 00038	1 -	-	28 Nitric Acid, Lot	250 mg/L M	ICPMSICV 00018	TO DO L	Arsente	0.08 mg/L
11/30/15 SPEX Certibrep, Lot 7-030ML Furchased Respent Batium 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0				28106			200		
11/30/15 SPEX Certibrep, Dot 7-230Will Furchased Respent Chromium								Barlum	1/5m 80'0
11/30/15 SPEX Certibrep. Dot 7-230Win Furchased Respent Salatum Orderium Or								Cadmium	0'08 mg/F
11/30/15 SPEX Cerifbrep. Dot 7-250ML (Eurchased Reagant) Setatuum Setatuum O								Chromium	0.08 mg/L
11/30/15 SPEX Certithrep, Dot 7-250Mil Fluctuased Reagent Average Structum Spiterium Sp								read	AND MOVE
11/30/15 SPEX Certibrep. Dot 7-200ML								Section 1990	0.08 me/1.
11/30/15 SPRX Certithrep. Lot 7-30Will Flucthsed Resgent Resent Calmium Cal								Silver	0.08 mg/L
12/31/15 11/09/15 DI Water, Lot 12/1717 250 min McALSPEGRAEV_00006 10 mg/Liver 12 12 12 12 12 12 12 1	MICPMSICV 00038	11/30/15	SB	PEX CertiBren, Lot 7-230		П	renti	Arsenic	2 pom
12/31/15 DI Water, Lot 12/1717 250 mL MCALSPEGAREV 00005 10 mg/L Alesand Selentum Calculum Calcu								Bartun	Bag 2
12/31/15 11/09/15 DI Water, Lot [£41717] 250 mid McALSPEGAREY_00006 10 mg/L Albento Selentum Silver Batium Chromium Chr								Cadmium	2 000
12/31/15 11/09/15 DI Water, Lot 12/31/17 250 mis McALSPEGAREY_00006 10 mg/L Argen.c Selentum Chromitum Chrom								Chromitim	man 2
12/31/15 11/09/15 DI Water, Lot 12/1717 250 mid WCALSPEGAREY 00006 10 mg/L Arsenic Saliver Chronium Chr								Lead	man 2
12/31/15 DI Water, Lot 12/31/17 250 mL MCALSPEGAREY 00006 10 mg/L Barium Salentum Cachaium C								Md	1000 mag
12/31/15 DI Water, Lot 12/31/17 250 mL MCALSPEGAREY 00006 10 mg/L Arsenic Cadmium Cadmium Cadmium Cadmium Chromium Lead Selenium Chromium Chromium Chromium Chromium Cadmium Chromium Cadmium Chromium Cadmium Chromium Chromium Chromium Cadmium Chromium Cadmium Chromium Cadmium Chromium Cadmium Chromium Cadmium Cadmium Cadmium Chromium Cadmium Silvet Selenium Silvet Berlic Berlium Silvet Berlium Chromium Cadmium Chromium Cadmium Arsenic Berlium Silvet Berlium Cadmium Arsenic Berlium Cadmium C								Selenium	mad 2
12/31/15 11/09/15 DI Water, Lot Ref1717 250 mL MCALSPEGAREV 00006 10 mg/L Alsenic								Silver	2 ppm
D6/01/16 InOrganic Ventures, Lot 32-MEB575123 (Furnhased Reagent) Eastum Chromium Silvet Chromium Silvet Seasont) Al Berium Barium Barium Berium Berium Berium Berium Berium Berium Berium Chromium Chromium Silvet Chromium Silvet Chromium Silvet Berium Berium Berium Berium Berium Berium Chromium Chromium Chromium Chromium Silvet Chromium Silvet Chromium Silvet Chromium Silvet Chromium Silvet Chromium Silvet Chromium Chromium Chromium Silvet Chr	48TD27 00053	12/21/15	11/00/154	of Water, Lot 1041917	250 mf./ M	CALSPEGAREV ORONS	1/1 m 1/1		0.2 nam
### Cadesium Cadesium Cadesium Cadesium Cadesium Lead Segent Pagent Page			2000000		NIM AND		The same of		man o
05/01/16 InOrganic Ventures, Lot G2-MEB505053 (Furnhased Reagent) Arsenic Chromium Chachium Silver Chromium Chachium Chachium Chachium Chromium Silver See See See See See See See See See S								DOLL FUND	man and
06/01/16 InOrganic Ventures, Lot 52-MEE575123 (Furchased Reagent) Lead Selentum Chromium Salentum Arsenic Be Bactum Bertum Bertum Bertum Chromium Chromium Salentum Arsenic Bertum B								Cadmium	ndd 2.0
C6/01/16 Indrganic Ventures, Lot G2-MEB575123 (Furnhased Reagent) Selentum Silver Cadmium Cadmium Chad Selentum Ch								Chromium	D.2 ppm
CEVOI/16 Integratic Ventures, Lot G2-MEB575123 (Furnhased Reagent) Arsentc Berlum Charchum Charchum Charchum Charchum Charchum Charchum Silvet Solentum Silvet Silvet Barrum Silvet Barrum Silvet Barrum Silvet Barrum Silvet Barrum Silvet Barrum Silvet Arsentc Barrum Charchum Silvet Arsentc Barrum Barrum Barrum Barrum Arsentc Barrum								Lead	d.2 ppm
Childs								Selenium	mad z.n
D6/01/16 Inorganic Ventures, Lot 32-MEE575123 (Furchased Reagent) Alexanic Cadmium Cadmium Cadmium Chical Selection Selection Silver Chromium Silver Selection Selecti								Silver	0.2 ppm
DS/01/16 INORGANIC VENTURES, Lot G2-NEB506053 (Furphased Reagent) Al	MCALSPECAREV CODGS	06/01/16	Inorda	nic Ventures, Lot 63-ME	5575123	(Purchased Reag	rent)	Arsente	5 ppm
Chromium Selenium Selenium Silvet Arsenic 4 8 8 8 8 8 100 8 8 100 8 8 100 8 100 8 100 8 100 8 100 1								Bartum	and S
Chromium Iced Chromium Iced Selenium Iced Selenium Iced Selenium Iced Selenium Seleniu								Cadmium	mdd 9
11/11/20								Chromium	mdd g
Selenium Selenium Selenium Selenium Silver Si								Lead	S ppm
Silver S								Selenium	5 ppm
05/01/16 INORGANIC VENTURES, Lot G2-MEB506053 (Furphased Reagent) Al Arsenic 4 4 100								Silvet	mad 9
Arsenic Bactum Bertum Rectum A1/1	TAPITTICPMS 00022	05/01/16	INORGAN	MIC VENTURES, Lot G2-ME	B506053	(Furnhased Read	renti	[H	200 na/mL
Bactum Be- CRAMitum						W		C. C	5 no/ml.
Beriston Beriston Opdmitten								m	100 ag/mL
Be- Cachakum								Bartur	200 ug/mL
Gadin,tun								Be	5 kg/mE
								Cadmitu	S ug/mL
					Page 48 of	166			11/11/2015

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REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Pittsburgh Jop No.: 480-89453-1

		7		Tuesmen	Patent Reagent	2123		
Respent ID	EMp	Prep	Dilutant	Final	Reagent ID	Volume	Analyte	Concentration
							Chromium	20 mg/mL
							CD	50 ng/mg
							Cu	25 ug/mL
							D.	100 ng/mL
							Lead	Z nd/mF
							Mr.	50 ng/mt
							N1	20 %g/mg
							Selenium	1 ng/mr
							Silver	and/mr
							31	100 ug/mL
							TI	Jm/Bn S
							A	50 ug/mL
							U2.	20 ng/mr
MTAPITTMSA 00027	11/01/16	INORGANIC	INORGANIC VENTURES, Lot 32-MEB584008	EB584008	(Furchased Reagent)	(dent)	ਹੋੜ ਹੜ	5000 ng/mL
							75	SOOO ng/mL
							Mg	Sood ug/mL
							Na	5000 ug/mp
MTAPITTMSC 00033	31/01/16	Inorganie	Inorganic Ventures, Lot J2-MEB584009	SB584009	(Purchased Reagent	igent)	Mo	100 mg/mL
ı							- Sir	50 ug/mL
							S	July waying
							Sic2	2140 ug/mL
							150	200 ug/mL
							Ti	100 uq/mL

Certification Summary

Client: U.S. Army Construction Engineering Resea Project/Site: Cerl Gasifier - Research Project

TestAmerica Job ID: 480-89453-1

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica Buffalo	California	State Program	9	1169CA
TestAmerica Buffalo	Connecticut	State Program	1	PH-0568
TestAmerica Buffalo	Florida	NELAP	4	E87672
TestAmerica Buffalo	Georgia	State Program	4	956
TestAmerica Buffalo	Georgia	State Program	4	N/A
TestAmerica Buffalo	Illinois	NELAP	5	200003
estAmerica Buffalo	Iowa	State Program	7	374
estAmerica Buffalo	Kansas	NELAP	7	E-10187
estAmerica Buffalo	Kentucky (DW)	State Program	4	90029
estAmerica Buffalo	Kentucky (UST)	State Program	4	30
estAmerica Buffalo	Kentucky (WW)	State Program	4	90029
estAmerica Buffalo	Louisiana	NELAP	6	02031
estAmerica Buffalo	Maine	State Program	1	NY00044
estAmerica Buffalo	Maryland	State Program	3	294
estAmerica Buffalo	Massachusetts	State Program	1	M-NY044
estAmerica Buffalo	Michigan	State Program	5	9937
estAmerica Buffalo	Minnesota	NELAP	.5	036-999-337
estAmerica Buffalo	New Hampshire	NELAP Primary AB	1	2973
estAmerica Buffalo	New Hampshire	NELAP Secondary AB	1	2337
estAmerica Buffalo	New Jersey	NELAP	2	NY455
estAmerica Buffalo	New York	NELAP	2	10026
estAmerica Buffalo	North Dakota	State Program	8	R-176
estAmerica Buffalo	Oklahoma	State Program	6	9421
estAmerica Buffalo	Oregon	NELAP	10	NY200003
estAmerica Buffalo	Pennsylvania	NELAP	3	68-00281
estAmerica Buffalo	Rhode Island	State Program	4	LAO00328
estAmerica Buffalo	Tennessee	State Program	4	TN02970
estAmerica Buffaio	Texas	NELAP	6	T104704412-15-6
estAmerica Buffalo	USDA	Federal	100	P330-11-00386
estAmerica Buffalo	Virginia	NELAP	3	460185
estAmerica Buffalo	Washington	State Program	10	C784
estAmerica Buffalo	West Virginia DEP	State Program	3	252
estAmerica Buffalo	Wisconsin	State Program	5	998310390
estAmerica Pittsburgh	Arkansas DEQ	State Program	6	88-0690
estAmerica Pittsburgh	California	State Program	9	2891
estAmerica Pittsburgh	Connecticut	State Program	1	PH-0688
estAmerica Pittsburgh	Florida	NELAP	4	E871008
estAmerica Pittsburgh	Illinois	NELAP	5	200005
estAmerica Pittsburgh	Kansas	NELAP	7	E-10350
estAmerica Pittsburgh	Louisiana	NELAP	6	04041
estAmerica Pittsburgh	New Hampshire	NELAP	1	2030
estAmerica Pittsburgh	New Jersey	NELAP	2	PA005
estAmerica Pittsburgh	New York	NELAP	2	11182
estAmerica Pittsburgh	North Carolina (WW/SW)	State Program	4	434
estAmerica Pittsburgh	Pennsylvania	NELAP	3	02-00416
estAmerica Pittsburgh	South Carolina	State Program	4	89014
estAmerica Pittsburgh	Texas	NELAP	6	T104704528-15-2
estAmerica Pittsburgh	US Fish & Wildlife	Federal		LE94312A-1
estAmerica Pittsburgh	USDA	Federal		P330-10-00139
estAmerica Pittsburgh	USDA	Federal		P-Soil-01
estAmerica Pittsburgh	Utah	NELAP	8	PA001462015-4
estAmerica Pittsburgh	Virginia	NELAP	3	460189
estAmerica Pittsburgh	West Virginia DEP	State Program	3	142
estAmerica Pittsburgh	Wisconsin	State Program	5	998027800

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TestAmeriba@Uffalo

Certification Summary

Client; U.S. Army Construction Engineering Resea Project/Site: Cerl Gasifier - Research Project

TestAmerica Job ID: 480-89453-1

Laboratory	Authority	Program	EPA Region	Certification ID
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Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.

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TestAmenta@Buffalo

METALS

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COVER PAGE METALS

ab Name	: TestAmerica Buffalo	Job Number: 480-89453-1
BDG No.:		
Project:	Cerl Gasifier - Research Project	
	Client Sample ID	Lab Sample ID
	A-01-020415-1600	480-89453-1
	A-01-031915-1600	180-89453-2
	A-01-040215-1505	480-89453-3
	A-01-050815-1600	490-89453-4

Comments:

COVER PAGE METALS

Lab Name	: TestAmerica Pittsburgh	Jab Number: 480-89453-1
BDG No.:		
Project:	Cerl Gasifier - Research Project	
	Client Sample ID	Lab Sample ID
	A-01-020415-1600	480-89453-1
	A-01-031915-1600	180-89453-2
	A-01-040215-1505	480-89453-3
	A-01-050815-1600	480-89453-4

Comments:

Client Sample	e ID: A-01-020415-1600)-		Lab Sample	ID: 480	89453=	L		
Lab Name: T	escAmerica Boffalo			Job No.:	480-89453-	1			
SMG ID.;									
Matrix: Soli	id			Date Sampl	ed: 02/04	/2015	16:00		
Reporting Ba	sis: DRY			Date Recei	ved: 10/2	0/2015	09:20		
* Solids: 8	9.4								
CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7439-97-6	Mercury	ND	0.022	0.0091	mg/Kg		H	1	7471B

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Client Sample ID: A-01-020415-1600	Lab Sample ID: 480-89453-1
Lab Name: TestAmerica Buffalo	Job No.: 480-89053-1
SEG ID.:	
Matrix: Solid	Date Sampled: 02/04/2015 16:00
Reporting Basis: WET	Date Received: 10/20/2015 09:20

CAS No.	Analyte	Result.	RL	MELL	Units	C	Q	DIF	Method
7440-38-2	Arsenic	ND	0.015	0.0056	mg/L		Н	1	6010C
7440-39-3	Barium	3,2	1.0	0.10	mg/L	-	H	1	6010C
7440-43-9	Cadmi um	ND	0.0020	0.00050	mg/L		H	-1	5010C
7440-47-3	Chromium	ND	0.020	0.010	mg/L		H	1	6010C
7439-92-1	Lead	0.0040	0.020	0.0030	mg/L	J	H	1	6010C
7782-49-2	Selenium	ND	0.13	0.044	mg/L		H	5	6010C
7440-22-4	Silver	ND	0.0060	0.0017	mg/L		H	1,	6010C
7439-97-6	Mercury	MD	0.00020	0.00012	mg/L		H	1	7470A

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Client Sample	e ID: A-01-031915-1600)		Lab Sample	ID: 480	-89453-	2		
Lab Name: T	escAmerica Boffalo			Job No.:	480-89453	-1			
SMG ID.;									
Matrix: Soli	id			Date Sampl	ed: 03/1	9/2015	16:00		
Reporting Ba	sis: DRY			Date Recei	ved: 10/	20/2015	09:20		
* Solids: 1	0,00								
CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7439-97-6	Mercury	ND	0.021	0.0083	mg/Kg	İ	T B	1	7471B

Client Sample ID: A-01-031915-1600	Lab Sample ID: 480-89453-2
Lab Name: TestAmerica Buffalo	Job No.: 480-89053-1
SEG ID.:	
Matrix: Solid	Bate Sampled: 03/19/2015 16:00
Reporting Basis: WET	Date Received: 10/20/2015 09:20

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIF	Method
7440-38-2	Arsenic	ND	0.015	0.0056	mg/L		Н	1	6010C
7440-39-3	Barium	1,9	1.0	0.10	mg/L		H	1	6010C
7440-43-9	Cadmium	ND	0.0020	0.00050	mg/L		H	1	6010C
7440-47-3	Chromium	0.029	0.020	0.010	mg/L		H	1	6010C
7439-92-1	Lead	ND	0.020	0.0030	mg/L		H	1	6010C
7782-49-2	Selenium	ND	0.13	0.044	mg/L		Н	5	6010C
7440-22-4	Silver	ND	0.0060	0,0017	mg/L		H	1	6010C
7439-97-6	Mercury	MD	0.00020	0.00012	mg/L		H	1	7470A

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Client Sample	e ID: A-01-040215-1508	5		Lab Sample	ID: 480	89453-	3		
Lab Name: T	escAmerica Boffalo			Job No.:	480-89453	-1			
SMG ID.;									
Matrix: Soli	id			Date Sampl	led: 04/0	2/2015	15:05		
Reporting Ba	sis: DRY			Date Recei	ved: 10/	20/2015	09:20		
* Solids: 1	0,00								
CAS No.	Analyte	Result	RL	MDL	Units	c	Q	DIL	Method
7439-97-6	Mercury	ND	0.020	0.0082	mg/Kg	T	B	1	7471B

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Client Sample ID: A-01-040215-1505	Lab Sample ID: 480-89453-3
Lab Name: TestAmerica Buffalo	Job No.: 480-89353-1
SEG ID.:	
Matrix: Solid	Date Sampled: 04/02/2015 15:05
Reporting Basis: WET	Date Received: 10/20/2015 09:20

CAS No.	Analyte	Result	RL	MELL	Units	C	Q	DIF	Method
7440-38-2	Arsenic	ND	0.015	0.0056	mg/L		Н	1	6010C
7440-39-3	Barium	3,7	1.0	0.10	mg/L		H	1	6010C
7440-43-9	Cadmi um	ND	0.0020	0.00050	mg/L		H	-1	5010C
7440-47-3	Chromium	0.015	0.020	0.010	mg/L	J	H	1	6010C
7439-92-1	Lead	0.0040	0.020	0.0030	mg/L	J	H	1	6010C
7782-49-2	Selenium	ND	0.13	0.044	mg/L		H	5	6010C
7440-22-4	Silver	ND	0.0060	0,0017	mg/L		H	1	6010C
7439-97-6	Mercury	MD	0.00020	0.00012	mg/L		H	1	7470A

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Client Sample ID: A-01-080815-1600 Lab Name: TestAmetica Buffalc SDG ID.:				Lab Sample ID: 480-89453-4							
				Job No.: 480-89353-1							
Matrix: Solid				Date Sampled: 05/08/2015 16:00							
Reporting Basis: DRY				Date Received: 10/20/2015 09:20							
* Solids: 9	9,2										
CAS No.	Analyte	Result	RL	MDL	Units	d	Q	DIL	Method		
7439-97-6	Mercury	0.011	0.021	0.0083	mg/Kg	j	B	1	7471B		

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Client Sample ID: A-01-050815-1600	Lab Sample ID: 480-89453-4
Lab Name: TestAmerica Buffalo	Job No.: 480-89153-1
SEG ID.:	
Matrix: Solid	Date Sampled: 05/08/2015 16:00
Reporting Basis: WET	Date Received: 10/20/2015 09:20

CAS No.	Analyte	Result	RL	MELL	Units	C	Q	DIF	Method
7440-38-2	Arsenic	ND	0.015	0.0056	mg/L			1	6010C
7440-39-3	Barium	3,8	1.0	0.10	mg/L		F1	1	6010C
7440-43-9	Cadmium	ND	0.0020	0.00050	mg/L			-1	5010C
7440-47-3	Chromium	ND	0.020	0.010	mg/L			1	6010C
7439-92-1	Lead	0.0074	0.020	0.0030	mg/L	J.		1	6010C
7782-49-2	Selenium	ND	0.I3	0.044	mg/L			5	6010C
7440-22-4	Silver	ND	0.0060	0.0017	mg/L			1,	6010C
7439-97-6	Mercury	MD	0.00020	0.00012	mg/L		Н	1	7470A

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Client Sample ID: A-01-020415-1600	Lab Sample ID: 480-89453-1
Lab Name: TestAmerica Pittsburgh	Jeb No.: 480-89353-1
SDG ID.;	
Matrix: Solid	Date Sampled: 02/04/2015 16:00
Reporting Basis: DRY	Oate Received: 10/20/2015 09:20
A month of the same	

% Solids: 89.4

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-38-2	Arsenic	3.6	0.54	0.097	mg/Kg			5	6020A
7440-39-3	Barium	382	5.4	0.058	mg/Kg			5	6020A
7440-43-9	Cadmi um	0.065	0.54	0.038	mg/Kg	J		5	6020A
7440-47-3	Chromium	663	1.1	0.033	mg/Kg		8	5	6020A
7440-22-4	Silver	0.21	0.54	0.021	mg/Kg	J		5	6020A
7439-92-1	Lead	0.70	0.54	0.020	mg/Kg			5	6020A
7782-49-2	Selenium	ND	2.7	0.27	mg/Kg			5	6020A

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Client Sample ID: A-01-031915-1600	Lab Sample ID: 480-89453-2
Lab Name: TestAmerica Pittsburgh	Job No.: 480-89353-1
EDG ID.;	
Matrix: Solid	Date Sampled: 03/19/2015 16:00
Reporting Basis: DRY	Date Received: 10/20/2015 09:20
Z 200 X 51 040 W	

% Solids: 100.0

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-38-2	Arsenic	3,3	0.46	0.086	mg/Kg			5	6020A
7440-39-3	Barium	350	4.B	0.051	mg/Rg			5	6020A
7440-43-9	Cadmi um	ND	0.48	0.033	mg/Kg			5	6020A
7440-47-3	Chromium	636	0.95	0.029	mg/Kg		8	5	6020A
7440-22-4	Silver	0.15	0.48	0.019	mg/Kg	J		5	6020A
7439-92-1	Lead	0.76	0.48	0.018	mg/Kg			5	6020A
7782-49-2	Selenium	0.44	2.4	0.24	mg/Kg	J		5	6020A

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Client Sample ID: A-01-040215-1505	Lab Sample ID: 480-89453-3
Lab Name: TestAmerica Pittsburgh	Job No.: 480-89953-1
SDG ID.:	
Matrix: Solid	Date Sampled: 04/02/2015 15:05
Reporting Basis: DRY	Date Received: 10/20/2015 09:20
X acces X for the control	

% Solids: 100.0

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-38-2	Arsenic	3,3	0.50	0.090	mg/Kg			5	6020A
7440-39-3	Barium	517	5.0	0.053	mg/Kg			5	6020A
7440-43-9	Cadmi um	0.042	0.50	0.035	mg/Kg	J		5	6020A
7440-47-3	Chrowium	337	0.99	0.030	mg/Kg		8	5	6020A
7440-22-4	Silver	0.12	0.50	0.019	mg/Kg	J		5	6020A
7439-92-1	Lead	1.0	0.50	0.019	mg/Kg			5	6020A
7782-49-2	Selenium	ND	2.5	0.25	mg/Kg			5	6020A

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Client Sample ID: A-01-050815-1600	Lab Sample ID: 480-89453-4
Lab Name: TestAmerica Pittsburgh	Job No.: 480-89953-1
SDG ID.:	
Matrix: Solid	Date Sampled: 05/08/2015 16:00
Reporting Basis: DRY	Date Received: 10/20/2015 09:20
9 5-11-1-1-1 00 2	

% Solids: 99.2

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7440-38-2	Arsenic	1.9	0,48	0.088	mg/Kg			5	6020A
7440-39-3 Barium		351	4.B	0.052	mg/Kg			5	6020A
440-43-9 Cadmium		ND	0.48	0.034	mg/Kg			5	6020A
7440-47-3	Chromium	197	0.97	0.030	mg/Kg		8	5	6020A
7440-22-4	Silver	0.11	0.48	0.019	mg/Kg	J		5	6020A
7439-92-1	Lead	2.5	0.48	0.018	mg/Kg			5	6020A
7782-49-2	Selenium	ND	2.4	0.24	mg/Kg			5	6020A

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2A-IN CALIBRATION VERIFICATIONS METALS

Lab Name: TestAmerica Buffalo Job No.: 480-89453-1

SDG No.:

TCV Source: MEI 04 ICV 00286 Concentration Units: mg/L

CCV Source: MEI 09 CCV 00200

Analyte	1CV 10/2	270880/5 15 16:00	10/2	270880/1 15 19:5	CCV 480-270880/23 10/23/2015 20:30							
	Found	С	True	S.R.	Found	C	True	% R.	Found	C	True	%R
Arsenic	0.362		0.375	96	0.511		0.500	102	0.517		0.500	103
Barium	0.374		0.375	100	0.518		0.500	104	0.519		0.500	104
Cadmium	0.366		0,375	98	0.515		0.500	103	0.517		0.500	103
Chromium	0.369		0.375	98	0.511		0.500	102	0.519		0.500	104
Lead	0.364		0.375	97	0.510		0.500	102	0.516		0.500	103
Selenium	0.367	-	0.375	98	0.510		0.500	102	0.520		0.500	104
Silver	0.371		0.375	99	0.518		0.500	104	0.524		0.500	105

Note: Calculations are performed before rounding to avoid round-off errors in calculated results. Italicized analytes were not requested for this sequence.

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2A-IN CALIBRATION VERIFICATIONS METALS

Lab Name: TestAmerica Buffalo	Job No.: 480-89453-1	
SDG No.:		
ICV Source: MEI 04 ICV 00286	Concentration Units: mg/L	
CCV Source: MEI 09 CCV 00200		

Analyte			270880/3: 15									
	Found	C	True	gr.	Found	C	True	% R.	Found	C	True	%R
Arsenic	0.507		0,500	101								
Barium	0.510		0.500	102								
Cadmium	0.511		0,500	102								
Chromium	0.516		0.500	103								
Lead	0.516		0.500	103								
Selenium	0.507	1	0.500	101								1
Silver	0.522		0.500	104								

Note: Calculations are performed before rounding to avoid round off errors in calculated results. Italicized analytes were not requested for this sequence.

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2A-IN CALIBRATION VERIFICATIONS METALS

Lab Name:	TestAmerica Buffalo	Job No.: 480-89453-1	
SDG No.:			
ICV Source	e: MEI 10 CCVL 00082	Concentration Units: mg/L	

to bodisc. Mil 10 ccvii 00082 domocnetacion sareb. mg/

CCV Source: MEI 10 CCVL 00082

Analyte	ICVL 10/2	0-270880/ 015 16:1	CCVL 10/2	-270880/1)15 19:5	CCVL 480-270880/25 10/23/2015 20:37							
	Found	C	True	S.R.	Found	C	True	BR.	Found	C	True	%R
Arsenic	0.0151		0.0150	101	0.0139	J	0.0150	92	0.0136	J	0.0150	91
Barium	0.00213		0.00200	107	0.00200		0.00200	100	0.00218		0.00200	109
Cadmium	0,00203		0.00200	102	0.00193	J.	0.00200	97	0.00209		0.00200	105
Chromium	0.00404		0.00400	101	0.00356	J	0.00400	89	0.00399	J	0.00400	10.0
Lead	0.00818	J	0.0100	82	0.00914	J	0.0100	91	0.00945	J	0.0100	95
Selenium	0.0238	J	0.0250	95	0,0231	J	0.0250	92	0.0228	J	0.0250	91
Silver	0.00620		0.00600	103	0.00668		0.00600	111	0.00587	J	0.00600	98

Note: Calculations are performed before rounding to avoid round-off errors in calculated results. Italicized analytes were not requested for this sequence.

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Lab Name: TestAmerica Buffalo	Job No.: 480-89453-1	
SDG No.:		
ICV Source: MEI 10 CCVL 00082	Concentration Units: mg/L	
CCV Source: MEI 10 CCVL 00082		

Analyte	CCVL 10/2		-270880/3 015 21:1									
	Found	C	True	SR.	Found	C	True	%.R.	Found	C	True	A R
Arsenic	0.0157		0.0150	105								
Barium	0.00251		0.00200	126								
Cadmium	0,00214		0.00200	107								
Chromium	0.00420		0.00400	105								
Lead	0.00976	J	0.0100	98								
Selenium	0.0270	Pal	0.0250	108								
Silver	0.00647		0.00600	108								

Note: Calculations are performed before rounding to avoid round off errors in calculated results. Italicized analytes were not requested for this sequence.

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Lab Name: TestAmerica Buffalo Job No.: 480-89453-1

SDG No.:

ICV Source: MEI 04 ICV 00286 Concentration Units: mg/L

CCV Source: MEI 09 CCV 00200

Analyte	10/2		271006/5 15 09:45		CCV . 10/2		271006/14 15 10:18		CCV 480-271006/18 10/24/2015 10:56				
	Found	С	True	&R	Found	C	True	S.R.	Found	c	True	%R	
Selenium	0.365		0,375	97	0.490		0.500	98	0,483		0.500	97	
Arsenic	0.362		0.375	96	0.488		0.500	98	0.480		0.500	96	
Barium	0.372		0,375	99	0.497		0.500	99	0.490		0.500	98	
Cadmium	0.364		0.375	97	0.493		0.500	99	0.487		0.500	97	
Chromium	0.366		0.375	98	0.493		0.500	99	0.486		0.500	97	
Lead	0.363		0.375	97	0.492		0.500	98	0.485		0.500	97	
Silver	0.369		0.375	98:	0.495		0.500	99	0.490		0.500	98	

Note: Calculations are performed before rounding to avoid round-off errors in calculated results. Italicized analytes were not requested for this sequence.

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Lab Name: TestAmerica Buffalo	Job No.: 480-89453-1
SDG No.:	
ICV Source: MEI 04 ICV 00286	Concentration Units: mg/L
CCV Source: MEI 09 CCV 00200	

Analyte			271006/20 15 11:30									
	Found	С	True	8 R	Found	C	Trus	% R.	Found	С	True	A R
Selenium	0.495		0.500	99								
Arsenic	0.497		0.500	- 99								
Barium	0.504		0,500	101		\Box						_
Cadmium	0.505		0.500	101								_
Chromium	0.503		0.500	101								
Lead	0.506		0.500	101								1
Silver	0.506		0.500	101								

Note: Calculations are performed before rounding to avoid round-off errors in calculated results. Italicized analytes were not requested for this sequence.

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ab	Name:	TestAmerica Buffalo	Jab No.:	480-89453-1	
DG	No.:				
		- TR		WASSEL THE WASSEL HAVE	

ICV Source: MEI 10 CCVL 00082 Concentration Units: mg/L

CCV Source: MEI 10 CCVL 00082

Analyte	10/2		0-271006/ 015 09:5:		CCVL 10/2		-271006/1 015 10;2		CCVL 480-271006/20 10/24/2015 11:03				
	Found	С	True	SR.	Found	C	True	%R.	Found	c	True	a R	
Selenium	0.0216	J	0.0250	86	0.0192	J	0.0250	77	0.0204	J	0.0250	81	
Arsenic	0.0119	J	0.0150	79	0.0143	J	0.0150	95	0.0137	J	0.0150	92	
Barium	0,00194	J	0.00200	97	0.00196	J	0.00200	98	0.00197	J	0.00200	99	
Cadmium	0.00200		0.00200	100	0.00229		0.00200	115	0.00214		0.00200	107	
Chromium	0.00415		0.00400	104	0.00419		0.00400	105	0.00379	J	0.00400	95	
Lead	0.00938	J	0.0100	94	0.00914	J	0.0100	91	0.00956	J	0.0100	96	
Silver	0.00604		0.00600	101	0.00583	J	0.00600	97	0.00616		0.00600	-103	

Note: Calculations are performed before rounding to avoid round-off errors in calculated results. Italicized analytes were not requested for this sequence.

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Lab Name: TestAmerica Buffalo	Job No.: 480-89453-1	
SDG No.:		
ICV Source: MEI 10 CCVL 00082	Concentration Units: mg/L	
CCV Source: MEI 10 CCVL 000B2		

Analyte	CCVL 10/2		-271006/3)15 11:4									
	Found	C	True	g R	Found	C	True	% R.	Found	С	True	A R
Selenium	0.0210	J	0.0250	84								
Arsenic	0.0151		0.0150	101								
Barium	0,00205		0.00200	103								
Cadmium	0.00217		0.00200	109								
Chromium	0.00381	J	0.00400	95								
Lead	0.0102		0.0100	102								_
Silver	0.00623		0.00600	104								

Note: Calculations are performed before rounding to avoid round-off errors in calculated results. Italicized analytes were not requested for this sequence.

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Lab Name: TestAmerica Buffalo Job No.: 480-89453-1

SDG No.:

ICV Source: MEH_HG2_WKG_01023 Concentration Units: mg/L

CCV Source: MEH HG2 WKG 01023

Analyte			-270289/1 015 16:3		2.0	0-270289/: 015 16:3		CCV 480-270289/16 10/21/2015 16:58				
	Found	C	True	§R.	Found	C	True	%R.	Found	C	True	%R
Mercury	0.00317	-	0.00300	106	0.00021		0.00020	109	0.00213	L	0.00200	107

Note: Calculations are performed before rounding to avoid round-off errors in calculated results. Italicized analytes were not requested for this sequence.

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Lab Name: TestAmerica Buffalo Job No.: 480-89453-1

SDG No.:

ICV Source: MEH HG2 WKG 01023 Concentration Units: mg/L

CCV Source: MEH HG2 WKG 01023

Analyte			-270289/20 015 17:1	_		-270289/3 015 17:3	CCVL 480-270289/40 10/21/2015 17:35					
	Found	С	True	SR.	Found	C	True	%R.	Found	C	True	8R
Mercury	0.00209	7.	0.00200	105	0.00212		0.00200	106	0.00018	J	0.00020	94

Note: Calculations are performed before rounding to avoid round-off errors in calculated results. Italicized analytes were not requested for this sequence.

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Lab Name: TestAmerica Buffalo Job No.: 480-89453-1

SDG No.:

TCV Source: MEH HG2 WKG 01024 Concentration Units: mg/L

CCV Source: MEH_HG2_WKG_01024

Analyte			-270525/1 015 15;2			0-270525/: 015 15:2		CCV 480-270525/40 10/22/2015 16:36				
	Found	C	True	S.R.	Found	C	True	FR.	Found	C	True	%R
Mercury	0.00315		0.00300	105	0.00024		0.00020 D	121	0.00207		0.00200	104

Note: Calculations are performed before rounding to avoid round-off errors in calculated results. Italicized analytes were not requested for this sequence.

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Lab Name: TestAmerica Buffalo Job No.: 480-89453-1

SDG No.:

ICV Source: MEH_HG2_WKG_01024 Concentration Units: mg/L

CCV Source: MEH HG2 WKG 01024

Analyte		-270525/5; 015 16:5	CCV 480-270525/62 10/22/2015 17:17				CCVL 480-270525/64 10/22/2015 17:20					
	Found	С	True	SR.	Found	C	True	FR.	Found	C	True	A.R
Mercury	0.00205		0.00200	103	0.00199		0.00200	100	0.00023	1	0.00020	116

Note: Calculations are performed before rounding to avoid round-off errors in calculated results. Italicized analytes were not requested for this sequence.

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Lab Name: TestAmerica Pittsburgh	Job No.: 480-89453-1
SDG No.:	
ICV Source: MICVX_00038	Concentration Units: ug/L
CCV Source: MCCV1X_00082	

	ICV 11/0	159963/5 15 16:3	CCV 180-159963/10 11/09/2015 17:09				CCV 180-159963/22 11/09/2015 18:13					
Analyte	Found	C	True	S.R.	Found	C	True	%R.	Found	C	True	% P
Arsenic	77,58		80.0	97	98.45		100	98	95.85		100	96
Barium	80.95		80.0	101	100.7		100	101	96.99		100	97
Cadmium	79.98		80.0	100	102.5		100	103	95.89		100	96
Chromium	79.71		80.0	100	102.4		100	102	99.07		100	99
Lead	80.82		80.0	101	104.3		100	104	97.93		100	98
Selenium	75.98	-	80.0	95	98.11		100	98	95.91		100	96
Silver	80.14		80.0	100	101.3		100	101	96.99		100	97
Magnesium	39520		40000	99	48800		50000	98	47590		50000	95

Note: Calculations are performed before rounding to avoid round off errors in calculated results. Italicized analytes were not requested for this sequence.

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Lab Name: TestAmerica Pittsburgh	Job No.: 480-89453-1	
SDG No.:		
ICV Source: MICVX_00038	Concentration Units: ug/L	
CON Payrock Modell & Doops		

	11/0	159963/3 15 19:2		CCV 180-159963/46 11/09/2015 20:35								
Analyte	Found	C	True	S.R.	Found	C	True	%R.	Found	С	True	%R
Arsenic	97,98		100	98	98.94		100	99				
Barium	98.79		100	- 99	99.21		100	99				
Cadmium	98.20		100	98	99,61		100	100				
Chromium	99.88		100	100	102.0		100	102				
Lead	104.8		100	105	105.3		100	105	-			
Selenium	98.02		100	98	99.95		100	100				
Silver	99.96		100	100	101.0		100	101				
Magnesium	47620		50000	95	47890		50000	96				

Note: Calculations are performed before rounding to avoid round off errors in calculated results. Italicized analytes were not requested for this sequence.

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2B-IN CRQL CHECK STANDARD METALS

Lab Name: TestAmerica Pittsburgh Job No.: 480-89453-1

SDG No.:

Method: 6020A Instrument ID: X

Lab Sample ID: CRI 180-159963/7 Concentration Units: ug/L

CRQL Check Standard Source: MCRIX 00075

		CRQL C	heck Standard		
Analyte	True	Found	Qualifiers	8R(1)	Limits
Arsenic	1.00	0.845	J	84	70-130
Barium	10.0	9.50	J	95	70-130
Cadmium	1.00	0.975	al.	98	70-130
Chromium	2.00	1.86	J	93	70-130
Silver	1.00	1.04		104	70-130
Lead	1.00	1.03		103	70-130
Selenium	5.00	4.38	-J	88 -	70-130

Lab Sample ID: CRI 180-159963/84 Concentration Units: ng/L

CRQL Check Standard Source: MCRIX 00075

		CRQL C	heck Standard	U	
Analyte	True	Found	Qualifiers	%R(1)	Limits
Arsenic	1.00	0.923	J	92	70-130
Barium	10.0	9.41	J	94	70-130
Cadmium	1.00	0.858	J	86	70-130
Chromium	2.00	2.01		100	70-130
Silver	1.00	0.968	J	97	70-130
Lead	1.00	0.969	J	97	70-130
Selenium	5.00	4.95	J.	99	70-130

Note! Calculations are performed before rounding to avoid round-off errors in calculated results. FORM IIB-IN

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Lab Name: TestAmerica Buffalo Job No.: 480-89453-1

SDG No.:

Concentration Units: mg/L

		ICB 480-270880/6 10/23/2015 16:11		CCB 480-270880/15 10/23/2015 19:54		CCB 480-270880/24 10/23/2015 20:33		CCB 480-270880/32 10/23/2015 21:12	
Analyte	RL.	Found	c	Found	C	Found	C	Found	C
Arsenic	0.015	ND		ND		ND		ND	
Barium	0.0020	ND		ND		ND)		ND	
Cadmium	0.0020	ND		ND		ND		ND	
Chromium	0.0040	ND		ND		ND		ND	
Lead	0.010	ND		ND		ND	-	ND.	
Selenium	0.025	ND		ND		ND	1	ND	
Silver	0.0060	ND		ND		ND	4	ND	

Italicized analytes were not requested for this sequence.

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Lab Name: TestAmerica Buffalo Job No.: 480-89453-1

SDG No.:

Concentration Units: mg/L

		ICB 480-271006/6 10/24/2015 09:48		CCB 480-271006/15 10/24/2015 10:21		CCB 480-271006/19 10/24/2015 11:00		CCB 480-271006/29 10/24/2015 11:39	
Analyte	RL.	Found	С	Found	C	Found	C	Found	C
Selenium	0.025	ND		ND-		ND		ND	
Arsenic	0.015	ND		ND		ND		ND	
Barium	0.0020	ND		ND		ND		ND	
Cadmium	0.0020	ND		ND		ND		ND	
Chromium	0.0040	ND		ND		ND		ND	
Lead	0.010	ND		ND.		ND		ND	
Silver	0.0060	ND		ND		ND		ND	

Italicized analytes were not requested for this sequence.

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Lab Name: TestAmerica Buffalo Job No.: 480-89453-1

SDG No.:

Concentration Units: mg/L

Analyte	RL	Found	C	Found	C	Found	C	Found	C
	ICB 480-270 10/21/2015	16:36	10/21/2015		CCB 480-2702 10/21/2015		All the second s	17:34	

Italicized analytes were not requested for this sequence.

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Lab Name: TestAmerica Buffalo Job No.: 480-89453-1

SDG No.:

Concentration Units: mg/L

Mercury	0.00020	ND		NE		ND	Y: -	N	D
Analyte	RL	Pound	C	Found	C	Found	C	Found	C
	The second secon		CCB 480-270525/41 10/22/2015 16:38		CONTRACTOR OF THE PROPERTY OF				

Italicized analytes were not requested for this sequence.

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Lab Name: TestAmerica Pittsburgh Job No.: 480-89453-1

SDG No.:

Concentration Units: ug/L

		ICB 180-159963/6 11/09/2015 16:48		CCB1 180-15996 11/09/2015 1		CCB2 180-159963/23 11/09/2015 18:22		CCB3 180-159963/35 11/09/2015 19:35	
Analyte	RL	Found	c	Found	C	Found	C	Found	C
Arsenic	1.0	ND	1	ND		ND		ND	
Barium	10.0	ND		ND		ND)		ND	
Cadmium	1.0	ND		ND		ND		ND	
Chromium	2.0	ND		ND		ND		ND	-
Lead	1.0	ND	1	ND		ND		ND	
Selenium	5.0	ND		ND		ND		ND	
Silver	1.0	ND		ND		ND		ND	
Magnesium	500	ND	ND			ND		ND	

Italicized analytes were not requested for this sequence.

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Lab Name: TestAmerica Pittsburgh Job No.: 480-89453-1

SDG No.:

Concentration Units: ug/L

		CCB4 180-1599 11/09/2015	63/47 20:44						
Analyte	RL.	Found	c	Found	C	Found	0.	Found	C
Arsenic	1.0	ND			1				
Barium	10.0	ND							
Cadmium	1.0	ND							
Chromium	2.0	ND							
Lead	1.0	ND							
Selenium	5.0	ND							1
Silver	1.0	ND							
Magnesium	500	ND							

Italicized analytes were not requested for this sequence.

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3-IN METHOD BLANK METALS

Lab Name: TestAmerica Buffalo	Job No.: 480-89453-1			
SDG No.:				
Concentration Units: mg/L	Lab Sample ID: MB 480-270374/2-A			
Instrument Code: ICAP2	Batch No.: 270880			

CAS No.	Analyte	Concentration	C	2	Method
7440-38-2	Arsenic	ND			6010C
7440-39-3	Barium	ND			60100
7440-43-9	Cadmium	ND			6010C
7440-47-3	Chromium	ND			6010C
7439-92-1	Lead	ND			6010C
7782-49-2	Selenium	ND			6010C
7440-22-4	Silver	ND			6010C

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3-IN METHOD BLANK METALS - TCLP

Lab Name: TestAmerica Buffalo

Job No.: 480-89453-1

SDG No.:

Concentration Units: mg/L

Instrument Code: ICAP2

Batch No.: 270880

CAS No.	Analyte	Concentration	C	2	Method
7440-38-2	Arsenic	ND			6010C
7440-39-3	Barium	ND			60100
7440-43-9	Cadmium	ND			6010C
7440-47-3	Chromium	ND			6010C
7439-92-1	Lead	ND			6010C
7782-49-2	Selenium	ND			6010C
7440-22-4	Silver	ND			6010C

FORM III-IN

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3-IN METHOD BLANK METALS

Lab Name: TestAmerica Buffalo	Jab No.: 480-89453-1
SDG No.:	
Concentration Units: mg/L	Lab Sample ID: MB 480-270385/2-A
Instrument Code: LEEMAN2	Batch No.: 270525

CAS No.	Analyte	Concentration	C	Q	Method
7439-97-6	Mercury	ND			7470A

FORM III-IN

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3-IN METHOD BLANK METALS - TCLF

Lab Name: <u>TestAmerica Buffalo</u> SDG No.:		Job No.: 480-89453+1
Concentration Units: mg/L		Lab Sample ID: LB2 480-270052/1-E
Instrument Code:	LEEMAN2	Batch No.: 270525

FORM III-IN

7439-97-6 Mercury

3-IN METHOD BLANK METALS

Lab Name: TestAmerica Buffalo	Job No.: 480-89453-1
SDG No.:	
Concentration Units: mg/Kg	Lab Sample ID: MB 480-270135/1-A
Instrument Code: LEEMAN2	Batch No.: 270289

CAS No.	Analyte	Concentration	C	Q	Method
7439-97-6	Mercury	ND			74718

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3-IN METHOD BLANK METALS

Lab Name: TestAmerica Pittsburgh	Job No.: 480-89453-1
SDG No.:	
Concentration Units: mg/Kg	Lab Sample ID: MB 180-159790/1-A
Instrument Code: X	Batch No.: 159963

CAS No.	Analyte	Concentration	C	2	Method
7440-38-2	Arsenic	ND			6020A
7440-39-3	Barium	ND			6020A
7440-43-9	Cadmium	ND	1000		6020A
7440-47-3	Chromium	0.00942	J		6020A
7440-22-4	Silver	ND			6020A
7439-92-1	Lead	ND			6020A
7782-49-2	Selenium	ND			6020A

FORM III-IN

Lab Name: TestAmerica Buffalo	Job No.: 480-89453-1
SDG No.:	
Lab Sample 1D: ICSA 480-270880/9	Instrument ID: ICAP2
Lab File ID: 121023158-4.asc	ICS Source: MEI 07 ICSA 00080
Concentration Units: mg/L	

	True	Found		
Analyte	Solution A	Solution A	Perdent Mecovery	
Arsenic		-0.0098		
Barium		0.0006		
Cadmium		0.0011		
Chromium		0.0023		
Lead		0.0039		
Selenium		-0.0003		
Silver		0.0004		
Aluminum	500	525	10.	
Antimony		0.0045		
Beryllium		0.0001		
Boron		-0.0048		
Calcium	500	473	9	
Cobalt		0.0036		
Copper		-0.0040		
Iron	200	185	9.	
Lithium	100	0.0153		
Magnesium	500	513	10	
Manganese		0.0008		
Molybdenum		-0.0010		
Nickel		0.0006		
Potassium		-0.0148		
Silicon		-0.0190		
Sodium		0.0825		
Strontium		0.0056		
Sulfur		-0.0225		
Thallium		-0.0063		
Tin		-0.0004		
Titanium		0.0008		
Vanadium		-0.0021		
Zinc		0.0115		

calculations are performed before rounding to avoid round-off errors in calculated results. FORM IVA-IN

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Lab Name: TestAmerica Buffalo	Job No.: 480-89453-1
SDG No.:	
Lab Sample 1D: ICSAB 480-270880/10	Instrument ID: ICAP2
Lab File ID: 121023158-4.asc	ICS Source: MEI 08 ICSAB 00096
Concentration Units: mg/L	

	True	Found	
Analyte	Solution AE	Solution AB	Perdent Recovery
Arsenic	0.100	0.0902	90
Barium	0.500	0.486	97
Cadmium	1.00	1.01	101
Chromium	0.500	0.484	91
Lead	0.0500	0.0505	101
Selenium	0.0500	0.0508	102
Silver	0.200	0.217	109
Aluminum	501	500	100
Antimony	0.600	0.603	100
Beryllium	0.500	0.485	9
Boron		0.0007	
Calcium	501	459	92
Cobalt	0.500	0.480	9.
Copper	0.500	0.504	100
Iron	100	92.8	9.
Lithium	0.500	0.536	10
Magnesium	501.	514	10.
Manganese	0.500	0.469	9.
Molybdenum		-0.0001	
Nickel	1.00	0.985	9
Potassium		0.0292	
Silicon	1.00	1.05	10:
Sodium		0.105	
Strontium	0.500	0.503	10.
Sulfur	1.00	1.08	10
Thallium	0.100	0.0910	9
Tin	1 1	-0.0010	
Titanium		0.0017	
Vanadium	0.500	0.505	10.
Zinc	1.00	0.925	93

calculations are performed before rounding to avoid round-off errors in calculated results. FORM IVA-IN

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Lab Name: TestAmerica Buffalo	Job No.: 460-89453-1
SDG No.:	
Lab Sample 1D: ICSA 480-271006/9	Instrument ID: ICAP2
Lab File ID: 12102415A-2.asc	ICS Source: MEI 07 ICSA 00080
Concentration Units: mg/L	

	True	Found	
Analyte	Solution A	Solution A	Perdent Recovery
Selenium		-0.0019	
Aluminum	500	509	102
Antimony		-0.0071	
Arsenic	100	-0.0093	
Barium		0.0006	
Beryllium		0.0001	
Boron		-0.0083	
Cachmium		0.0010	
Calcium	500	459	94
Chromium		0.0013	
Cobalt		0.0039	
Copper		-0.0040	
Iron	200	180	90
Lead		0.0010	
Lithium		0.0084	
Magnesium	500	498	10
Manganese		0.0008	
Molybd⊖num		-0.0012	
Nickel		0.0010	
Potassium		0.0141	
Silicon		-0.0089	
Silver		0.0001	
Sodium		0.0566	
Strontium		0.0054	
Sulfur		-0.0099	
Thallium		-0.0090	
Tin		-0.0005	
Titanium		0.0009	
Vanadium		-0.0015	
Zinc		0.0099	

calculations are performed before rounding to avoid round-off errors in calculated results. FORM IVA-IN

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Lab Name: TestAmerica Buffalo	Job No.: 460-89453-1
SDG No.:	
Lab Sample 1D: ICSAB 480-271006/10	Instrument ID: ICAP2
Lab File ID: 12102415A-2.asc	ICS Source: MEI 08 ICSAB 00096
Concentration Units: mg/L	

	True	Found		
Analyte	Solution AE	Solution AB	Percent Recovery	
Selenium	0.0500	0.0510	102	
Aluminum	501	488	98	
Antimony	0.600	0.580	97	
Arsenic	0.100	0.0921	92	
Barium	0.500	0.479	96	
Beryllium	0.500	0.474	95	
Boron		-0.0036		
Cachmium	1.00	0.982	98	
Calcium	501	451	90	
Chromium	0.500	0.475	95	
Cobalt	0.500	0.471	94	
Copper	0.500	0.499	100	
Iron	100	90.4	90	
Lead	0.0500	0.0464	93	
Lithium	0.500	0.525	105	
Magnesium	501	505	101	
Manganese	0.500 0.461		92	
Molybdenum		-0.0011		
Nickel	1.00	0.966	97	
Potassium		0.0198		
Silicon	1.00	1.05	105	
Silver	0.200	0.214	107	
Sodium		0.0959		
Strontium	0.500	0.493	99	
Sulfur	1.00	1.06	106	
Thallium	0.100	0.0878	88	
Tin		-0.0016		
Titanium		0.0016		
Vanadium	0.500	0.495	99	
Zinc	1.00	0.984	98	

calculations are performed before rounding to avoid round-off errors in calculated results. FORM IVA-IN

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Lab Name	: TestAmerica Pittsburgh	Job No.: 480-89453-1	
SDG No.			
Lab Samp	ole 1D: ICSA 180-159963/8	Instrument ID: X	
Lab File	ID: X51109A.sml	ICS Source: MICSAX_00074	

Concentration Units: ug/L

	True	Found		
Analyte	Solution A	Solution A	Perdent Mecovery	
Arsenic		0.256		
Barium		0.0480		
Cadmium		0.628		
Chromium		1.45		
Lead		0.220		
Selenium		0.0790		
Silver		0.0400		
Aluminum	100000	100800	101	
Antimony		0.0450		
Beryllium		0.0300		
Boron		0.297		
Calcium	100000	104800	105	
Cobalt		0.0850		
Copper		2.18		
Iron	100000	105700	106	
Magnesium	100000	104200	104	
Manganese		0.396		
Molybdenum	2000	2246	7.12	
Nickel		0.204		
Potassium	1.00000	104000	104	
Silicon		29.4		
Sodium	100000	102700	103	
Strontium		0.763		
Thallium		0.0000		
Tin		-0.108		
Titanium	2000 2269		11:	
Vanadium		-0.0100		
Zinc		3.81		

calculations are performed before rounding to avoid round-off errors in calculated results.
FORM IVA-IN

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Lab Name: TestAmerica Pittsburgh	Job No.: 480-89453-1
SDG No.:	
Lab Sample 1D: ICSAB 180-159963/9	Instrument ID; X
Lab File ID: X51109A.xml	ICS Source: MICSABX 00078
Concentration Units: ug/L	

	True	Found		
Analyte	Solution AE	Solution AB	Percent. Recovery	
Arsenic	20.0	19.6	98	
Barium	20.0	19.9	100	
Cadmium	20.0	21.0	105	
Chromium	20.0	21.0	105	
Lead	20.0	20.9	104	
Selenium	50.0	49.1	98	
Silver	20.0	19.2	96	
Aluminum	100000	93757	94	
Antimony	20.0	19.9	93	
Beryllium	20.0	20.5	10	
Boron	50.0	54.4	105	
Calcium	100000	98117	98	
Cobalt	20.0	20.0	100	
Copper	20.0	20.5	100	
Iron	100000	99317	96	
Magnesium	100000	96623	9	
Manganese	22.0	19.6	-85	
Molybd⊖num	2000	2096	10:	
Nickel	20.0	19.2	98	
Potassium	1,00000	97567	91	
Silicon	500	538	108	
Sodium	100000	95160	9:	
Strontium	25.0	20.5	82	
Thallium	20.0	20.3	10:	
Tin	100	101	10	
Titanium	2000	2115	10	
Vanadium	20.0	19.3	96	
Zinc	25.0	22.7	9.	

calculations are performed before rounding to avoid round-off errors in calculated results. FORM IVA-IN

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5A-IN MATRIX SPIKE SAMPLE RECOVERY METALS

Client ID: A-01-020415-1600 MS Lab ID: 480-89453-1 MS

Lab Name: TestAmerica Buffalo Job No.: 480-89453-1

SDG No.:

Matrix: Solid Concentration Units: mg/Kg

% Solids: 89.4

Analyte	SSR C	Sample Result (SR)	Spike Added (SA)	%R	Control Limit %R	Q	Method
Mercury	0.378	ND	0.376	100	80-120		7471B

SSR = Spiked Sample Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

Note - Results and Reporting Limits have been adjusted for dry weight.

FORM VA. - IN

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5A-IN MATRIX SPIKE SAMPLE RECOVERY METALS - TCLP

Client ID: A-01-050815-1600 MS	Lab ID: 480-89453-4 MS
Lab Name: TestAmerica Buffalo	Job No.: 480-89453-1
SDG No.:	
Matrix: Solid	Concentration Units: mg/L
4 Salida.	

Analyte	SSR	Sample Result (Si	R)	Spike Added (SA)	%R	Control Limit %R	Q	Method	
Arsenic	1.19	ND	ND		119	75-125		6010C	
Barium	4.78	3.8		1.00	100	75-125		6010C	
Cadmium	1.13	ND		1.00	113	75-125		6010C	
Chromium	0.999	ND		1.00	100	75-125		6010C	
Lead	1.04	0.0074	J	1.00	103	75-125		6010C	
Seleníum	0.970	ND		1.00	97	75-125		6010C	
Silver	1.17	ND		1.00	117	75-125		6010C	
Mercury	0.00627	ND		0.00668	94	80-120		7470A	

SSR = Spiked Sample Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

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5A-IN MATRIX SPIKE DUPLICATE SAMPLE RECOVERY METALS

Client ID: A-01-020415-1600 MSD Lab ID: 480-89453-1 MSD

Lab Name: TestAmerica Buffalo Job No.: 480-89453-1

SDG No.:

Matrix: Solid Concentration Units: mg/Kg

% Solids: 89.4

Analyte	(SDR)	Spike Added (SA)	%R	Control Limit %R	RPD	RFD Limit	Q	Method
Mercury	0.378	0.376	101	80-120	0	201		7471B

SDR = Sample Duplicate Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

Note - Results and Reporting Limits have been adjusted for dry weight.

FORM VD - IN

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5A-IN MATRIX SPIKE DUPLICATE SAMPLE RECOVERY METALS - TCLF

Client ID: A-01-050815-1600 MSD	Lab ID: 480-89453-4 MSD	
Lab Name: TestAmerica Buffalo	Job No.: 480-89453-1	
SDG No.:		
Matrix: Solid	Concentration Units: mg/L	
A P-19-4-1		

Analyte	(SDR)	Spike Added (SA)	%R:	Control Limit %R	RPD	RPD Limit	Q	Method
Arsenic	1.12	1.00	112	75-125	- 6	20		6010C
Barium	4.48	1.00	71	75-125	-6	20	F1	6010C
Cadmium	1.07	1.00	107	75-125	6	20		6010C
Chromium	0.942	1.00	94	75-129	6	20		6010C
Lead	0.982	1.00	97	75-125	6	20		60100
Selenium	1.07	1.00	107	75-125	10	20		6010C
Silver	1.10	1.00	110	75-125	- 6	20		6010C
Mercury	0.00627	0.00668	94	80-120	0	20		7470A

SDR = Sample Duplicate Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VD - IN

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5B-IN POST DIGESTION SPIKE SAMPLE RECOVERY METALS - TCLP

Lab Name: TestAmerica Buffalo Job No.: 480-89453-1

SDG No.:

Matrix: Solid Concentration Units: mg/L

Analyte	SSR	Sample Result (SR) C C		Spike Added (SA)	%R	Control Limit %R	Q	Method 6010C
Arsenic	1.18			1.00	118	80-120		
Barium	4.74	3.8		1.00	96	80-120		6010C
Cadmium	1.13	ND		1.00	113	80-120		6010C
Chromium	0.989	ND		1.00	99	80-120		6010C
Lead	1.03	0.0074	J	1.00	102	80-120		6010C
Selenium	5.10	ND	-1	5.00	102	80-120		6010C
Silver	1.17	ND		1.00	117	80-120		6010C

SSR = Spiked Sample Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

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7A-IN LAE CONTROL SAMPLE METALS

Lab ID: LCS 480-270374/3-A

Lab Name: TestAmerica Buffalo Job No.: 480-89453-1

Sample Matrix: Water LCS Source: MED_TCLP_D0013

Analyte	Water(mg/L)									
	True	Found	C	8R	Limit	s	Q	Method		
	1.00	1,07		107	80	120	_	6010C		
Barium	1.00	0.973	J	97	80	120		6010C		
Cadmium	1.00	1.02		102	80	120		6010C		
Chromium	1.00	0.982		98	80	120		6010C		
Lead	1.00	0.980		98	80	120		6010C		
Selenium	1.00	1.09		109	8.0	120		6010C		
Silver	1.00	1.04		104	80	120		6010C		

Calculations are performed before rounding to avoid round-off errors in calculated results.

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7A-IN LAE CONTROL SAMPLE METALS

Lab ID: LCS 480-270385/3-A

Lab Name: TestAmerica Buffalo Job No.: 480-89453-1

Sample Matrix: Water LCS Source: MEH HG TCLP W 00073

				Water (ng/L)			
Analyte	True	Found	C	8R	Limit	s	Q	Method
Mercury	0.00668	0.00645		97	80	120		7470A

Calculations are performed before rounding to avoid round-off errors in calculated results.

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7A-IN LGS-GERTIFIED REFERENCE MATERIAL, METALS

Lab ID: LCSSRM 480-270135/2-A

Lab Name: TestAmerica Buffalo Job No.: 480-89453-1

Sample Matrix: Solid LCS Source: MED SRM_D085_00002

				Solid(mg/Kg)			
Analyte	True	Found	C	8.R	Limit:	S	Q	Method
Mercury	8.37	9.27		110.7	51,3	148.1		7471B

Calculations are performed before rounding to avoid round-off errors in calculated results.

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7A-IN LAE CONTROL SAMPLE METALS

Lab ID: LCS 180-159790/2-A

Lab Name: TestAmerica Pittsburgh Job No.: 480-89453-1

Sample Matrix: Solid LCS Source: MTAPITTICPMS_00022

		Solid(mg/Kg)								
Analyte	True	Found	C	8R	Limit	s	Q	Method		
Arsenic	3.92	3,65		93	80	120		6020A		
Barium	196	176.9		90	80	120		6020A		
Cadmium	4.90	4.65		95	80	120		6020A		
Chromium	19.6	20.66		105	80	120		6020A		
Silver	4.90	4.72		96	80	120		6020A		
Lead	1.96	1.97		100	80	120		6020A		
Selenium	0.980	0.911		93	80	120		6020A		

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

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7D-IN LAB CONTROL SAMPLE DUPLICATE METALS

Lab ID: LCSD 180-159790/3-A

Lab Name: TestAmerica Pittsburgh Job No.: 480-89453-1

Sample Matrix: Solid LCS Source: MTAPITTICPMS 00022

Analyte	(SDR) C	Spike Added	%R	Control Limit %R	RPD	RPD Limit	Q	Method
Arsenic	3.59	3.85	93	80-120	2	20		6020A
Barium	173.0	192	90	80-120	2	20		6020A
Cadmium	4.51	4.81	94	80-120	3	20		6020A
Chromium	20.06	19.2	104	80-120	3	20		6020A
Silver	4.67	4.81	97	80-120	1	20		6020A
Lead	1.94	1.92	1.01	80-120	- 1.	20		6020A
Selenium	0.878	0.962	91	80-120	4	20		6020A

SDR = Spike Duplicate Results
Calculations are performed before rounding to avoid round-off errors in calculated results.

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8-IN ICP-AES AND ICP-MS SERIAL DILUTIONS METALS - TCLP

Lab ID: 480-89453-4	
SDG No:	
Lab Name: TestAmerica Buffalo	Job No: 480-89453-1
Matrix: Solid	Concentration Units: mg/L

Analyte	Initial Samp. Result (I)		Serial Dilution Result (S)	C	% Difference	Q	Method
Arsenic	ND		ND		NC		6010C
Barium	3.8		3.74	J	1.0		6010C
Cadmium	ND	- 1	ND		NC		6010C
Chromium	ND		ND		NC		6010C
Lead	0.0074	J.	ND		NC.		6010C
Selenium	ND		ND		NC		6010C
Silver	ND:	- 1	ND		NC		6010C

Calculations are performed before rounding to avoid round-off errors in calculated results. FORM VIII-IN

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8-IN ICP-AES AND ICP-MS SERIAL DILUTIONS METALS

Lab ID: 480-8945	53-1				
SDG No:					
Lab Name: TestAn	merica Buffalo	Job No:	480-89453-1		
Matrix: Solid		Concent	ration Units:	ng/Kg	
Analyte	Initial Sample Result (I) C	Serial Dilution Result (S) C	% Difference	Q	Method
Mercury	ND	ND	NC		7471B

Calculations are performed before rounding to avoid round-off errors in calculated results. FORM VIII-IN

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8-IN ICP-AES AND ICP-MS SERIAL DILUTIONS METALS - TCLP

Lab ID: 480-8945	53-4				
SDG No:					
Lab Name: TestAr	merica Buffalo	Job No:	480-89453-1		
Matrix: Solid		Concent	ration Units:	ng/L	
Analyte	Initial Sample Result (I) C	Serial Dilution Result (S) C	% Difference	Q	Method
Mercury	ND	ND	NC		7470A

Calculations are performed before rounding to avoid round off errors in calculated results. FORM VIII-IN

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9-IN DETECTION LIMITS METALS - TCLP

Lab Name: TestAmerica Buffalo Job Number: 480-89453-1

SDG Number:

Matrix: Solid Instrument ID: ICAP2

Method: 6010C MDL Date: 04/29/2015 13:01

Prep Method: 3010A Leach Method: 1311

Analyte	Wavelength/ Mass	RL (mg/L)	MDL (mg/L)
Arsenic	189.042	0.015	0.00555
Barium	455,403	1	0.1
Cadmium	228,802	0.002	0.0005
Chromium	267.716	0.02	0.01
Lead	220.353	0.02	0.003
Selenium	196.090	0.025	0.0087
Silver	328.068	0.006	0.0017

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9-IN CALIBRATION BLANK DETECTION LIMITS METALS - TCLF

Lab Name: TestAmerica Buffalo Job Number: 480-89453-1

SDG Number:

Matrix: Solid Instrument ID: ICAP2

Method: 6010C XMDL Date: 04/29/2015 13:01

Analyte	Wavelength/ Mass	XRL (mg/L)	XMDL (mg/L)
Arsenic	189.042	0.015	0.00555
Barium	455,403	0.002	0.0007
Cadmium	228.802	0.002	0.0005
Chromium	267.716	0.004	0.001
Lead	220,353	0.01	0.003
Selenium	196,090	0.025	0.0087
Silver	328.068	0.006	0.0017

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9-IN DETECTION LIMITS METALS - TCLP

Lab Name: TestAmerica Buffalo Joi

Job Number: 480-89453-1

SDG Number:

Matrix: Solid Instrument ID: LEEMAN2

Method: 7470A MDL Date: 01/28/2010 00:00

Prep Method: 7470A Leach Method: 1311

Analyte Wavelength/ RL MDL (mg/L) (mg/L)

Mercury 253.7 0.0002 0.00012

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9-IN CALIBRATION BLANK DETECTION LIMITS METALS - TCLF

Lab Name: TestAmerica Buffalo Job Number: 480-89453-1

SDG Number:

Matrix: Solid Instrument ID: LEEMAN2

Method: 7470A XMDL Date: 01/28/2010 00:00

Analyte	Wavelength/ Mass	XRL (mg/L)	XMDL (mg/L)
Mercury	253,7	0,0002	0.00012

FORM IX - IN

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9-IN DETECTION LIMITS METALS

Lab Name: TestAmerica Buffalo Job Number: 480-89453-1

SDG Number:

Matrix: Solid Instrument ID: LEEMAN2

Method: 7471B MDL Date: 01/29/2010 00:00

Prep Method: 7471B

Analyte	Wavelength/	RL	MDL
	Mass	(mg/Kg)	(mg/Kg)
Mercury	253.7	0.02	0.0081

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9-IN CALIBRATION BLANK DETECTION LIMITS METALS

Lab Name: TestAmerica Buffalo Job Number: 480-89453-1

SDG Number:

Matrix: Solid Instrument ID: LEEMAN2

Method: 7471B XMDL Date: 01/29/2010 00:00

Analyte	Wavelength/ Mass	XRL (mg/L)	(mg/L)
Mercury	253,7	0.0002	0.00012

FORM IX - IN

Page 118 of 166

9-IN DETECTION LIMITS METALS

Lab Name: TestAmerica Pittsburgh Job Number: 480-89453-1

SDG Number:

Matrix: Solid Instrument ID: X

Method: 6020A MDL Date: 01/23/2010 19:04

Prep Method: 3050B

Analyte	Wavelength/ Mass	RL (mg/Kg)	MDL (mg/Kg)
Arsenic	75	0.1	0.0181
Barium	137	1	0.0107
Cadmium	111	0.1	0.007
Chromium	52	0.2	0.0061
Lead	208	0.1	0.0038
Selenium	82	0.5	0.0502
Silver	107	0.1	0.0039

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9-IN CALIBRATION BLANK DETECTION LIMITS METALS

Lab Name: TestAmerica Fittsburgh	Job Number: 480-89453-1
SDG Number:	
Matrix: Solid	Instrument ID: X
Method: 6020A	XMDL Date: 01/23/2010 19:04

Analyte	Wavelength/ Mass	XRL (ug/L)	(ug/L)
Arsenic	75	1	0.2908
Barium	137	10	0.098
Cadmium	111	1	0.1144
Chromium	52	2	0.5433
Lead	208	1	0.0192
Selenium	82	5	0.4216
Silver	107	1	0.0362

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10-IN ICE-AES INTERELEMENT CORRECTION FACTORS METALS

Lab Name: TestAmerica Buffalo

Job Number: 480-89453-1

SDG No.:

ICE-AES Instrument ID: ICAP2

Date: 10/13/2015

Asse Turks	Mave		200	· p	L	7	L	j.	Ž	Þ	100	100	- At	144	.0
	THETTER	A.	en E	DG P	ā	3	3.	3	3	Ф	MG	MD	ON	N	5
-	308,215														
-	206.833							0.016886		-0.000038			-0.003460		
-	189,042							-0.016699				l	-0.001439		-0.0000224
+	455,403														4
-	313,042														
-	208.959												0.045987		0.00077341
H	228,802		005232							-0.000007				-0.000183	
-	337,933											1			
-	267,716									-0.000009		0.000128			
1	328.616												-0.001422		
-	327,396				0.000028					-0.000012					
+	259,940										0.000214	-0.000349			
-	220,353	-0.000045					-0,000313		0.002016	0.000014		0.000089	-0.001660	0.000081	0.00011293
-	670,784														
-	279.079											-0.005496	-0.016782		
-	257,610	0.00005								0.000013					
Molybdenam	202,030									-0.000008		-0.000089			
-	231,604									0.000035					
-	766.490														
-	196,090	-0,000116								-0.000019		0.000437			
-	288,158							-0.001254							
\vdash	328,068									-0.000013		-0.000015			
-	589,592														Ī
-	407.771														
-	182,034	-0.000111													
H	330,856	0.000021					0.004001								
	189,989														
	334.904				0.000005			0.000199					0.000497		
	292,403									0.000016			-0.003989		

NI-X

X-IN

10-IN ICP-AES INTERELEMENT CORRECTION EACTORS METALS

Lab Name: TestAmerica Buffalo

Job Number: 480-89453-1

SDG No.:

Date: 10/13/2015

ICP-AES Instrument ID: ICAP2

Ni Mo Mh Mg Ф |23 20 -0.001712 B 23 8 0 Be HS Al Wave 206,200 Analyte SAME

in.

11/11/2015

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10-IN 10-IN INTERELEMENT CORRECTION FACTORS METALS

Lab Name: TestAmerica Buffalo

Job Number: 480-89453-1

SDG No.:

ICP-AES Instrument ID: ICAP2 Date:

Date: 10/13/2015

Analyte Length Sn	Aluminum 308.215	Antimony 206.833	Arsenic 189.042	Barium 455,403	Beryllium 313.042	Boron 208,959	Cadmium 228,802	Calcium 317,933	Chromium 267.716	Cobalt 228,616	Copper 327,396	Tron 259,940	Lead 220.353	Lichium 670.784	Magnesium 279.079	Manganese 257.610	Nolybdenum 202.030	Nickel 231,504	Potassium 766,490	Selenium 196,090	Silicon 288.158	Silver 328,068	Sodium S89.592	Strontium 407,771	Sulfur 182.034	Thallium 190.856	Tin 189,989	Titanium 334,904	Vanadium 292.402
五		0.000781			-0.001012					0.001956	-0.002019		-0.00454		-0.003460						-0.022549	-0.000143				-0.000286	-0.000712		0.000374
11	-			-									19												in ,	7			
Λ	0.007523				0.000334					I Co	-0.000724		-0.000044			-0.000070					0.003607	0.000018				-0.0006667			
																						İ							
						1																							
	_																												

X-IN

11-IN LINEAR BANGES METALS

Lab Name:	TestAmerica Buffalo	Job No: 480-89453-1
SDG No.:		
Instrument	1D: ICAP2	Date: 09/29/2015 14:49

Analyte	Integ. Time (Sec.)	Concentration (mg/L)	Method
Arsenic	15	30	6010C
Barium	15	10	6010C
Cadmium	15	5	6010C
Chromium	15	50	6010C
Lead	15	120	6010C
Selenium	15	60	6010C
Silver	15	3	6010C

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11-IN LINEAR RANGES METALS

Lab Name: TestAmerica Buffalo	Job No: 460-89453-1
SDG No.:	
Instrument ID: LEEMAN2	Date: 10/13/2015 15:08

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	Method
Mercury	10	10	7470A
Mercury	10	10	7471B

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11-IN LINEAR RANGES METALS

Lab Name:	TestAmerica Pittsburgh	Job No: 480-89453-1	
SDG No.:			
Instrument	ID: X	Date: 03/14/2011 22:35	

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	Method
Arsenic		4500	6020A
Barium		13500	6020A
Cadmium		13500	6020A
Chromium		13500	6020A
Silver		2500	6020A
Lead		20000	6020A
Selenium		4500	6020A

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Lab Name: TestAmerica Buffalo Job No.: 480-89453-1

SDG No.:

Prep Method: 3010A

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight	Initial Volume (mL)	Final Volume (mL)
LB2 480+270052/1-C	10/22/2015 11:30	270374		5.0	50
MB 480-270374/2-A	10/22/2015 11:30	270374		50	50
LCS 480-270374/3-A	10/22/2015 11:30	270374		50	50
480-89453-1	10/22/2015 11:30	270374		50	50
480-89453-2	10/22/2015 11:30	270374		50	50
480-89453-3	10/22/2015 11:30	270374		50	5.0
480-89453-4	10/22/2015 11:30	270374		50	.50
480-89453-4 MS	10/22/2015 11:30	270374		5.0	50
480-29453-4 MSD	10/22/2015 11:30	270374		50	50

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Lab Name: TestAmerica Buffalo Job No.: 480-89453-1

SDG No.:

Prep Method: 7471B

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 480-270135/1-A	10/21/2015 15:00	270135	+0.5937		50
LCSSRM 480-270135/2-A	10/21/2015 15:00	270135	+0.0239		50
480-89453-1	10/21/2015 15:00	270135	+0.5970		50
480-89453-1 MS	10/21/2015 15:00	270135	+0.5942		50
480-89453-1 MSD	10/21/2015 15:00	270135	+0.5954		50
480-89453-2	10/21/2015 15:00	270135	+0.5845		50
480-89453-3	10/21/2015 15:00	270135	+0.5921		50
480-89453-4	10/21/2015 15:00	270135	+0.5874		5.0

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Lab Name: TestAmerica Buffalo Job No.: 480-89453-1

SDG No.:

Prep Method: 7470A

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight	Initial Volume (mL)	Final Volume (mL)
LB2 480+270052/1-E	10/22/2015 12:15	270385		30	5.0
MB 480-270385/2-A	10/22/2015 12:15	270385		30	50
LCS 480-270385/3-A	10/22/2015 12:15	270385	-	30	50
480-89453-1	10/22/2015 12:15	270385		30	50
480-89453-2	10/22/2015 12:15	270385		30	50
480-89453-3	10/22/2015 12:15	270385		30	50
480-89453-4	10/22/2015 12:15	270385		30	.50
480-89453-4 MS	10/22/2015 12:15	270385		30	50
480-29453-4 MSD	10/22/2015 12:15	270385		30	50

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Lab Name: TestAmerica Pittsburgh Job No.: 480-89453-1

SDG No.:

Prep Method: 3050B

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 180-159790/1-A	11/09/2015 12:44	159790	00001.04		100
LCS 180-159790/2-A	11/09/2015 12:44	159790	00001,02		100
LCSD 180-159790/3-A	11/09/2015 12:44	159790	00001.04		100
480-89453-1	11/09/2015 12:44	159790	00001.04		100
480-89453-2	11/09/2015 12:44	159790	00001.05		100
480-89453-3	11/09/2015 12:44	159790	00001.01		100
480-89453-4	11/09/2015 12:44	159790	00001.04		100

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Lab Name:	TestAmerica Buffalo	Job No.: 480-89453-1
SDG No.:		
Instrument	ID: ICAP2	Method: 6010C
Start Date	: 10/23/2015 15:55	End Date: 10/23/2015 21:15

											P	na.	lyt	es						
Lab Sample ID	D / F	T Y	Time	Ag	As	Ва	o d	cr	P	20 0										
ICIS 480-270880/1	1		15:55	1.8	X	X	X	8	X	×	-	-	-		+	+	+		+	+
IC 480-270880/2	-		15:58	X	X	X	X	X	X	20							1			
IC 480-270880/3	1		16:01	2.	X	×	X	X	X	x					+	+	1		\rightarrow	\rightarrow
IC 480-270880/4	+		16:04	X.	X	X	3	X	3	x	_				+	+	1			
ICV 480-270880/5	1		16:08	X.	X	X	X	X	Х	×		1			+	+	+		-	
ICB 480-270880/6	1		16:11	X	Х	Х	*	X	X	X	_	\vdash	1	+	-	+	1		\rightarrow	\rightarrow
ICVL 480-270880/7	1		16:14	X	X	Х	X	Ж	X	30			-		-	+-	-			\rightarrow
22222	+		16:17	-	-		- 67		-	72	_	-		-	-	+	+		-	
ICSA 480-270880/9	1		16:20	Х	X	Х	X	N	Ж	X	-	-			+	+-	+		-	-
ICSAB 480-270880/10	1		16:24	X.	X	X	X	X	X	X					+	+	+		\rightarrow	\pm
CCV 480-270880/11	-		16:27	-		-		1	-		-	-	-	-	+	+	+		-	-
CCB 480-270880/12	1		16:30	+							_				+	+	+		\rightarrow	\rightarrow
CCVL 480-270880/13	+		16:33	+		-		-			_		+	-	+	+	+		-	\rightarrow
CCV 480-270880/14	1		19:51	X	X	Х	X	X	X	×		-	+	-	+	+-	+	1	-	-
CCB 480-270880/15	1		19:54	X	X	X	X	X	X	x	-	\vdash	+	-	+	+	+		-	+
CCVL 480-270880/16	1		19:57	×	X	X	X	X	X	X	-		+		+	-	+		-	-
LB2 480-270052/1-C	1	P	20:10	2	X	Х	X	X	X	X.	_		+		+	+	+			-
MB 480-270374/2-A	1	Т	20:14	X	X	Х	X	Х	X	x	-				+	+	+		-	-
LCS 480-270374/3-A	1	T	20:17	×	X	Х	X	X	X	X	_	-		-	+	+-	+	-	-	\rightarrow
480-89453-1	1	P	20:20	X	X	Х	2	10.0	X		_	-	-	\rightarrow	+	+	+	-	\rightarrow	\rightarrow
480-89453-2	1	P	20:23	-X	X	X	X	X	X		_	-	+		+	+	+		\rightarrow	-
480-89453-3	1	P	20:27	X	X	R	X	Х	К		_		-		+	+	+		-	-
CCV 480+270880/23	1		20:30	N	X	Х	X	Ж	Х	x	_		-		+	+	+		-	-
CCB 480-270880/24	1		20:33	X	Х	Х	X		Х	x			-		-	-	-		-	-
CCVL 480-270880/25	1		20:37	X	X	X	×	X	X	30	_		\vdash		-	+-	+		-	
480-89453-4	1	P	20:40	3.	X	X	X	X	X	150	_				+	-	1			-
480-89453-4 SD	5.	P	20:43	X	X	X	X	X	X		_		+		+	+	+		\rightarrow	\rightarrow
480-89453-4 PDS	1	P	20:47	N.	X	×	X	X	Х		-	-	+		+	+	+			
480-89453-4 MS	1	P	20:50	X	X	Х	X	X	X			-			-	-	1			-
480-89453-4 MSD	1	P	20:53	X.	X	X	X	100	X		_		-		+	+	1		-	\rightarrow
CCV 480-270880/31	1		21:09	X	X	Х	X	X	X	x	-					1	+		-	+
CCB 480-270880/32	1		21:12	N	X	X	X	X	Х	20	-		-			-	-		-	-
CCVL 480-270880/33	1		21:15	X	X	X	X	X	X	%	_	-	-		-	+	+		-	\rightarrow

Prep Types

P = TCLP

T = Total/NA

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Lab Name: TestAmerica Buffalo	Job No.: 480-89453-1
SDG No.:	
Instrument ID: ICAP2	Method: 6010C
Start Date: 10/24/2015 09:32	End Date: 10/24/2015 11:42

				Analytes									
Lab Sample ID	D ,/ F	T Y P		S e									
ICIS 480-271006/1	1		09:32	8									
IC 480-271006/2			09:36	X.									
IC 480-271006/3			09:39	2.									
IC 480-271006/4	+		09:42	X.									
ICV 480-271006/5	1		09:45	8									
ICB 480-271006/6	1		09:48	X									
ICVL 480-271006/7	1		09:52	X									
CRI 480-271006/8	-		09:55	-									
ICSA 480-271006/9	1		09:58	Х									
ICSAB 480-271006/10	1		10:02	X.									
CCV 480-271006/11	+-		10:05										
CCB 480-271006/12	+		10:08	+									
CCVL 480-271006/13	+		10:12										
CCV 480-271006/14	1		10:18	X									
CCB 480-271006/15	1		10:21	X									
CCVL 480-271006/16	1		10:25	X									
480-89453-1	5	P	10:53	2									
CCV 480-271006/18	1		10:56	X									
CCB 480-271006/19	1		11:00	×									
CCVL 480-271006/20	1		11:03	X									
480-89453-2	5	P	11:06	- X									
480-89453-3	5	P	11:09	Х									
480-89453-4	5	P-	11:13	W									
480-89453-4 SD	25	P	11:16	X									
480-89453-4 PDS	5	P	11:19	X									
480-89453-4 MS	5	P	11:23	23.									
480-89453-4 MSD	5	P	11:26	X									
CCV 480-271006/28	1		11:36	×									
CCB 480-271006/29	1.1		11:39	Х									
CCVL 480-271006/30	1		11:42	- X.									

Prep Types
P = TCLP

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Lab Name:	TestAmerica Buffalo	Job No.:	480-89453-1	
SDG No.:				

Instrument ID: LEEMAN2 Method: 7470A

Start Date: 10/22/2015 15:26 End Date: 10/22/2015 17:20

									P	mal	ytes	2					
Lab Sample ID	D / F	T Y p	Time	g g													
ICV 480-270525/1	1		15:26	18					1			- 1	T			Ť	1
ICB 480-270525/2	1		15:28	X.													
ICVL 480-270525/3	1		15:29	X.													
CCV 480-270525/4			15;31														T
CCB 480-270525/5	11,		15:33			7 ()								- 1			T
232222			15:34														
ZZZZZZ			15:36														
ZZZZZZ	1		15:38														
ZZZZZZ			15:40														
222222			15:41														
ZZZZZZ			15:43														
ZZZZZZ			15:45														T
ZZZZZZ			15:47										T-				
ZZZZZZ	1		15:48	+					-	1		1	1		-	1	$^{+}$
222222	-		15:50			Tilli			-1-			1	1	-			\top
CCV 480-270525/16			15:52	11			$\overline{}$			1		-	Ť.	11.1		-1	1
CCB 480-270525/17			15:54				+										
ZZZZZZ			15:55														+
ZZZZZZ	1		15:57	+			-		_				1			_	\pm
222222	1		15:59	111			+		\neg		\vdash		1			+	+
222222			16:01	11			\vdash			\vdash			1			\pm	+
ZZZZZZ			16:03			-										\pm	
ZZZZZZ	1		16:04	11		-	+		-				1			-	1
222222			16:06				+		_			_	1			-	+
222222	1		16:08	111					_			1	1			-	+
ZZZZZZ			16:09	++			+					1	1			-	+
ZZZZZZ	_		16:11	+ +		-						+	1			+	\pm
CCV 480-270525/28			16:14				\vdash		-			-	1			_	
CCB 480-270525/29	1		16:16	+			_		_		\vdash	1	1		-	_	+
222222	7		16:17	1			+		_			1	1			_	+
222222	-		16:19	+++			=					1	1		=	_	+
ZZZZZZ	1		16:21	+++		-	+		_			1	1			_	\pm
22222	-		16:22	+++			\vdash	_	_			\top	1		\neg	\pm	+
333322	11-		16:24			-	-		_				1			\pm	+
ZZZZZZ			16:26	++													
ZZZZZZ			16:28														
ZZZZZZ			16:29													+	+
222223			16:32	+ +									1		\exists	+	+
ZZZZZZ	1		16:34	+++			1			1			1			+	+
CCV 480-270525/40	1		16:36	- 8												1	+
CCB 480-270525/41	1		16:38	- X		-	1	-	_			+	1			+	+
233222	-		16:39	+++	_		+	-	_	-	-	-	+		-	-	+

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Lab Name: TestAmerica Buffalo Job No.: 480-89453-1

SDG No.:

Instrument ID: LEEMAN2 Method: 7470A

Start Date: 10/22/2015 15:26 End Date: 10/22/2015 17:20

		T Y P	Time	Analytes										
Lab Sample ID	D / F			g										
ZZZZZZ	1		16:41											
222222	1		16:43											
ZZZZZZ			16:45											
ZZZZZZ			16:48											
ZZZZZZ			16:50	111										
222222	1		16:51	1 1										
LB2 480-270052/1-E	1	P	16:53	X										
MB 480-270385/2-A	1	T	16:56	X										
LCS 480-270385/3-A	1	T	16:57	Х										
CCV 480-270525/52	1		16:59	X.										
CCB 480-270525/53	1		17:01	X										
480-89453-1	1	P	17:02	-8.										
480-89453-2	1	E	17:04	Х										
480-89453-3	1	P	17:05	Х										
480-89453-4	1	P	17:08	X										
480-89453-4 SD	5	P	17:10	*										
480-89453-4 MS	1	P	17:11	2.										
480-89453-4 MSD	1	P	17:14	X										
ZZZZZZ			17:15											
CCV 480-270525/62	1		17:17	X										
CCB 480-270525/63	1		17:18	-8.										
CCVL 480-270525/64	1		17:20	X										

Prep Types

P - TOLP

T = Total/NA

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ab l	Name:	TestAmerica Buffalo	Job No.:	480-89453-1	

SDG No.:
Instrument ID: LEEMAN2 Method: 74718

Start Date: 10/21/2015 16:34 End Date: 10/22/2015 07:38

								A	nal	ytes						
Lab Sample ID	D / F	T y p	Time	a H												
ICV 480-270289/1	1		16:34	18		111					1	1	T	Ť	Ť	Ť
ICB 480-270289/2	1		16:36	X.												Ť
ICVL 480-270289/3	1		16:38	2.												Ť
CCV 480-270289/4			16:39													Ť
CCB 460-270269/5			16:41			1111										+
232222			16:42												1	Ť
ZZZZZZ			16:43								1					\top
ZZZZZZ			16:45													+
ZZZZZZ			16:47										\rightarrow		1	†
222222			16:48													+
222222			16:49													+
222322			16:51										\rightarrow			$^{+}$
222222			16:53	111									\rightarrow	+	+	\pm
22222	-		16:54	+++		-	11	_			+	1	\rightarrow	+	+	+
222222			16:56					_	\vdash		1	1	\rightarrow	-	+	+
CCV 480-270289/16	1		16:58	X				_	\vdash		+	1	\rightarrow	+	+	+
CCB 480-270289/17	1		16:59	2.		-	+		\vdash		+	1	\rightarrow	+	+	\pm
ZZZZZZ			17:01							-	+	1	-	+	+	+
ZZZZZZ			17:02	-			-	_	\vdash	_	+	1	-	_	+	+
222222			17:03	+++	-	-	+	_	\vdash	_	+	+	\rightarrow	_	+	+
222222			17:05	-				_	\vdash	_	+	1	\rightarrow	+	+	+
ZZZZZZ			17:07	-		-	+	_		-	+	+	-	+	+	+
ZZZZZZ	-		17:08	-	-	-	-	-		-	+	+	-	-	+	+
222222			17:09	-				-			+-	1	-	-	+	+
222222			17:11	+++			+	+	\vdash	_	+	1	\rightarrow	+	+	+
ZZZZZZ			17:13	++-		_	+	+	\vdash	_	+	+	\rightarrow	+	+	+
MB 480-270135/1-A	1	Т	17:14	X		-	+	-	\vdash	-	+	+	\rightarrow	+	+	+
CCV 480-270289/28	1		17:16	X		-	-	+	\vdash	-	+-	-	\rightarrow	-	+	+
CCB 480-270289/29	- 1		17:17	X		-		-	\vdash	-	+	1	\rightarrow	-	+	+
LCSSRM 480-270135/2-A	1	T	17:18	X.		_	-	_	\vdash	_	+	-	\rightarrow	+	+-	+
480-89453-1	1	T	17:20	X				_		-	+		-		+	\pm
480-89453-1 SD	5	T	17:21	X	-	-	-	-	\vdash	-	+	+	\rightarrow	-	+	+
480-89453-1 MS	1	T	17:23	X			-	+		-	+	-	-	+	+	+
480-89453-1 MSD	1	T	17:25	X.			++	+	\vdash	-	+	-	+	-	+	+
480-89453-2	1	T	17:26	8.		-		-		-	+	-	-	-	+	+
480-89453-3	1	T	17:29	20	-		-	-		-	+	-	-	-	+	+
480-89453-4	1	T	17:30	X				-		-	+		-	+	+	+
CCV 480-270289/38	1		17:32	X		11 11 11		-		-	-	-	-	-	+	+
CCB 480-270289/39	1		17:34	X				-			+		-	-	+	+
CCVL 480-270289/40	1		17:35	X				-		-	+		-	-	+	+
CCV 480-270289/41	4		07:27					-		-	+		-	-	+	+
CCB 480-270289/42	-		07:29										_	_	-	+

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13-IN ANALYSIS RUN LOG METALS JOB No. : 480-89453-1

Lab Name:	TestAmerica Buffalo	Job No.: 480-89453-1
SDG No.:		
Instrument	ID: LEEMAN2	Method: 74718
Start Date	: 10/21/2015 16:34	End Date: 10/22/2015 07:38
		Analytes

						Anal	ytes				
Lab Sample ID	II y F	HYDE	Time	H g							
ZZZZZZ			07:30	111	-1-1	1-1-		1	1-1-	11	
CCV 480-270289/44			07:34								
CCB 480-270289/45			07:37								
CCVL 480-270289/46	-		07:38								

Brep Types
T = Total/NA

Lab Name: TestAmerica Pittsburgh	Job No.: 480-89453-1
SDG No.:	
Instrument ID: X	Method: 6020A
Start Date: 11/09/2015 14:45	End Date: 11/10/2015 12:42

											An	al	yte	S					
Lab Sample ID	D / F	T y p	Time	a	As	Ва	G q	Cr	Þ	00 00									
ITUNE 180-159963/1			14:45	1							-1-1	T	$\overline{}$	-		F			
STD1 180-159963/2 IC	1		16:23	X.	X	X	X	X	X	20	-	\rightarrow							
STD2 180-159963/3 IC	1		16:29	28.	X	X	X	X	X	x		\forall	\forall	1	+				
STD3 180-159963/4 IC	1		16:34	X.	X	X	X	X	3	X	-	\exists	\exists		+				
ICV 180-159963/5	1		16:39	X	X	X	X	X	Х	X	-	1	\forall		+				
ICB 180-159963/6	1		16:48	X	Х	Х	*	X	X.	X	-	\dashv	\forall		1	1		\neg	
CRI 180-159963/7	1		16:53	X	X	X	X	Х	X	30		\dashv	\exists	-	1	1			
ICSA 180-159963/8	1		16:58	X.	X	Х	X	X	X	X		\forall	_	_	+				
ICSAB 180-159963/9	1		17:04	Х	X	Х	X	10.00	Ж	X			\exists		1				
CCV 180-159963/10	1		17:09	X.	2	X	8	8	X	X		1	+		1				
CCB1 180-159963/11	Y		17:17	Х	X	Х	X	X	X.	X		+	+						
ZZZZZZ			17:22										-						
222222			17:27	-							-	+	-		+				
ZZZZZZ			17:32	+							\rightarrow	+	+	_	+	1			
222222	_		17:37	+		-					-	-	+	_	+	+			
222222			17:42	+							\rightarrow	+	\dashv	+	+	+			
222222			17:47	+							\rightarrow	+	\dashv		+				\exists
ZZZZZZ	-		17:52	+		-					-	+	-	-	+				
ZZZZZZ	_		17:57	+							\rightarrow	+	-	_	+	+			\dashv
222222	-		18:03	+		-					\rightarrow	\rightarrow	\dashv	_	+	_			
ZZZZZZ	1		18:08	+							\rightarrow	\pm	\rightarrow	_	+				\exists
CCV 180-159963/22	1		18:13	X	X	X	X	Х	K	X	\rightarrow	+	-	-	+				
CCBZ 180+159963/23	1		18:22	Х	X	X	X	Ж	Х	X	-	-	-	-	+	+	-		
223222			18:27	-	-	-		-	- 50	~ 1	-	-	\dashv	-	+	-			-
22222	-		18:32	+-				H			+	+	+	-	+	-			
ZZZZZZ	-		18:37	+		-		-			\rightarrow	+	-	+	+	+			
MB 180-159790/1-A	1	T	18:46	X	X	X	X	X	×	X	\rightarrow	+	-	+	+	+			
LCS 180-159790/2-A	1	T	18:51	×	X	X	X	X	Х	×	-	-	-	-	+	-			
LCSD 180-159790/3-A	1	T	18:56	X	X	X	X	X	X	X	-	+	-	-	+	-			
222222	-	-	19:05	- 10	-	115		79	100		\rightarrow	-	\dashv	-	+	-			
222222			19:11	+							\rightarrow	-	-		+				
ZZZZZZ	-		19:16	+	-						\rightarrow	-	-	-	+	+	-		
232222			19:21	+							+	+	+	+	+				
CCV 180-159963/34	1		19:26	X	X	X	X	×	X	30	+	+	\dashv	-	+				
CCB3 180-159963/35	1		19:35	X	X	X	X	X	25	X	+	+	+	-	+	-			
ZZZZZZ	-		19:40	+	-			-	-	-		-	-	-	+	-			
ZZZZZZ	-		19:45	+				-			+	+	-	-	+				
732222			19:50		-	-		-			\rightarrow	\rightarrow	\dashv			-		\rightarrow	\dashv
777777	-		19:56	+	-						+++	+	\dashv	-	+				
480-89453-1	5	T	20:01	X	X	X	×	X	X	X	-	+	+	-	+				
480-89453-2	5	T	20:06	- 20	X	X	X	X	X	X		-	-	-	-	-			
480-89453-3	5	T	20:11	X	X	X	X	X	X	X		-	-		+	-	-	-	

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Lab Name:	TestAmerica Pittsburgh	Job No.: 480-89453-1
SDG No.:		
Instrument	ID: X	Method: 6020A
Start Date	: 11/09/2015 14:45	End Date: 11/10/2015 12:42

	ili d	1										Ana	lyt	es							
Lab Sample ID	D / F	T y p	Time	A	As	Ва	Cd	C r	Þ	S a											
480-89453-4	1 5	T	20:16	18	X	28	×	8	X	×		1	1	1	100						F
333333	+		20:25			- 1															H
222222			20:30																		H
CCV 180-159963/46	1		20:35	X.	X	2	3	X	.8.	X											t
CCB4 180-159963/47	1		20:44	X.	X	X	X	8	X	×		+	+			1					H
222222			20:49								-	-	+	1	\vdash	1					H
ZZZZZZ	1		20:54	-																	t
22222	_		20:59	_	-	_							+			+					
222222	1		21:05	+								_	+	+		+					H
222222	1		21:10	_									+								H
222222			21:15	+									-								+
222222	+		21:24																		t
222222	+		21:29	-																	H
22222	1		21:34	+							+	+	+	+	-	-					H
223222	+		21:39	+		-						+	+	+	\vdash	-					H
CCV 180-159963/58	1		21:44	+							-	+	+	+	-						H
CCB5 180-159963/59	+		21:53	+								+	+			1					H
22222	+		21:58	+								+	+	+	Н						H
ZZZZZZ	+		22:03	+								+	+	_	\vdash						H
222222	+-		22:08	+							-	+	+	+	-	-					H
22222	+		22:13	+								+	+			1					H
ZZZZZZ	+		22:19	+							-	+	+	-	-						H
ZZZZZZ	+		22:24	+		-		\vdash				+	+	+	-	-			-	-	H
223222			22:29	-				-				-	+	-	-	-					H
22222	+		22:34	+								+	+	+		1					H
ZZZZZZ	+		22:39	+		-						+	+	-	-	-				_	H
ZZZZZZ	+-		22:44	+			-	-		-	-	+	+	-	-	-		H		-	H
CCV 180-159963/70	+		22:53	+				-				+	+	-	-	-				_	H
CCB6 180-159963/71	+		23:02	+							-	-	+	+		-					H
222322	+-		23:07	+-							-	+	+	+		-					H
222222	+-		23:12	+							-	+	+	+		-					H
ZZZZZZ	1		23:17	+				-			-	+	+	-	-	-				-	H
222222	+		23:22	+							-	+	+	-		-					+
773722	1		23:28	+	-		-	H			-	+	+		1	1					+
ZZZZZZ	+		23:33	+				-		_		+	+	-	-	-					H
ZZZZZZ	+		23:38	+		-		-		-	-	+	+	-	-	-		-		-	+
ZZZZZZ	+		23:43	+				-				+	+	-	-	-					H
232223	+		23:48	-		-					-	+	+	-	1						H
777777	1		23:53	+								+	+	-							-
CCV 180-159963/82	+		23:58	+							-	+	+								H
CCB7 180-159963/83	1	-	00:07	-								+	+	-	-	-					-
CRI 180-159963/84	1		00:18	Х	Х	Х		Х	75	X.	_	-	-	-	-		_	-			1

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Lab Name:	TestAmerica Pittsburgh	Job No.: 480-89453-1
SDG No.:		
Instrument	ID: X	Method: 6020A
Start Date	. 11/09/2015 14:45	End Date: 11/10/2015 12:42

											A	nal	yte	g							
Lab Sample ID	D ,/ F	e d	Time	a	A	Ba	G q	cr	P	05 d)											
ZZZZZZ			00:23	1								T		-1	-1		Ť	1	Ť	T	T
22222	-		00:28					11.11													T
ZZZZZZ			00:33																		T
ZZZZZZ			00:38																		T
ZZZZZZ			00:43												7	\top		\top		1	Ħ
222222			0.0:48	_										1		\top	_	_		1	t
ZZZZZZ			00:53													\top	\top	1			t
ZZZZZZ	1		00:58											_	_			_			+
CCV 180-159963/93	1		01:03											_	_	\pm		\pm		1	t
CCB8 180-159963/94			01:13													\top					t
222222			01:18											7	1	\top	+	+			t
ZZZZZZ			01:23											1		\top		\pm			t
ZZZZZZ			01:28									\exists		7	7	\top	T	1			t
ZZZZZZ	1-		01:33	+								\neg		+	-	+	1	+	+	1	t
222222	1		01:38	_									\neg	7	1	\top		-	1		t
CCV 180-159963/100			01:43	_								\exists		7	1	\top		1		1	+
CCB9 180-159963/101			01:52											-							t
ZZZZZZ	1		12:01									\exists		\dashv	1						t
ZZZZZZ	1		12:05	\top								\exists	\rightarrow	\pm	1	\pm	1	\pm		+	t
222223	1		12:27	+								\neg	\neg	\forall		+					+
22222	1		12:32									\exists		-	1	+	1				t
CCV 180-159963/106			12:37																		1
CCB 180-159963/107	1		12:42										-		-		_	+		1	+

Prep Types T = Total/NA

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15-IN ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY METALS

Lab	Name:	TestAmerica Pittsburgh	Job No.:	480-89453-1
SDG	No.:			

ICB-MS Instrument ID: X Start Date: 11/09/2015 End Date: 11/10/2015

				Inte	rna	l Standar	ds 1	RI For:			
Lab Sample ID	Time	Element Li-6	Q	Element Sc	Q	Element Y-89	Q	Element Rh-103	Q	Element In	Q
STD1 180-159963/2 I	16:23	100		100		100		100		100	T
STD2 180-159963/3 I	16:29	92		97		106		98		98	
STD3 180-159963/4 I	16:34	107		107		109		107		107	Т
ICV 180-159963/5	16:39	104		104		111		103		104	
ICB 180-159963/6	16:48	108		110		117		112		111	
CRI 180-159963/7	16:53	105		108		110		110		109	
ICSA 180-159963/8	16:58	79		90		105		91		95	
ICSAB 180-159963/9	17:04	77		90		105		92		95	1
CCV 180-159963/10	17:09	90		97		113		102		104	
CCB1 180-159963/11	17:17	98		105		118		111		111	\top
CCV 180-159963/22	18:13	83		92		110		101		101	
CCB2 180-159963/23	18:22	89		100		113		107		106	
ME 180-159790/1-A	18:46	66		79		97		91		92	1
LCS 180-159790/2-A	18:51	69		79		102		87		89	1
LCSD 180-159790/3-A	18:56	71		80		101		86		89	
CCV 180-159963/34	19:26	85		95		109		97		98	
CCB3 180-159963/35	19:35	86		101		113		105		103	
480-89453-1	20:01	52		69		101		76		81	1
480-89453-2	20:06	55		73		105		82		86	
480-89453-3	20:11	55		76		107		80		84	
480-89453-4	20:16	54		73		98		78		80	
CCV 180-159963/46	20:35	78		87		101		90		91	
CCB4 180-159963/47	20:44	88		96		107		100		99	
CRI 180-159963/84	00:18	59		71		80		75		76	

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15-IN ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY METALS

Lab	Name:	TestAmer	ica	Pittsburgh	Job No	.: 4	30-89453-1			
SDG	No.:									
ICP-	MS In	strument	ID:	x	Start	Date	11/09/2015	End	Date:	11/10/2015

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Tb	Q	Element Ho	Q	Element Bi	Q	Element	Q	Element	Q
STD1 180-159963/2 I	16:23	100		100		100					
STD2 180-159963/3 I	16:29	102		102		96					
STD3 180-159963/4 I	16:34	107		107		105					
ICV 180-159963/5	16:39	107		106		100					
ICB 180-159963/6	16:48	112		111		109					
CRI 180-159963/7	16:53	109		108		106					
ICSA 180-159963/8	16:58	101		102		94					
ICSAB 180-159963/9	17:04	103		104		95					
CCV 180-159963/10	17:09	108		107		100					
CCB1 180-159963/11	17:17	112		111		109					
CCV 180-159963/22	18:13	107		107		100					
CCB2 180-159963/23	18:22	108		108		1,07					
MB 180-159790/1-A	18:46	97		97		98					
LCS 180+159790/2-A	18:51	98		99	-	90			_		
LCSD 180-159790/3-A	18:56	98		98		89					
CCV 180-159963/34	19:26	105		104		96					
CCB3 180-159963/35	19:35	108		107		107					
480-89453-1	20:01	91		92		85					
480-89453-2	20:06	95	-	96	-	88					
480-89453-3	20:11	94		94		87					
480-89453-4	20:16	91		92		83					
CCV 180-153963/46	20:35	99		99		92					
CCB4 180-159963/47	20:44	104		104		103					
CRI 180-159963/84	00:18	81		82		83					

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\$ 001 100 8 100 8

12,53 SU 12.58 SU 12.58 su

9:00 9:00 9:00

10/22/15 10/22/15 10/22/15

Plastic Plastic Plastic

1311, 3010A, 6010C

A-01-050815-1600

A-01-040215-1505 1311, 3010A,

480-89453-A-3 480-89453-A-4

400 mL 500 mL

500 mL

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METALS BATCH WORKSHEET

Batch Analyst: Salverson, Jessica L 09:40 Batch Start Date: 10/21/15 Job No.: 480-89453-1 Lab Name: TestAmerica Buffalo Batch Number: 270052 SDG No.:

Batch End Date:

Batch Method: 1311

Lab Sample ID	Lab Sample ID Client Sample ID	-	8818	Method Chain Basis InitialAmount	FinalAmount	EFD PartSizeRed	EFD SampleWeigh	EFD SampleWeigh EFD VolumeWater	Efb_InitialpH
LB2 480-270052/1		1311, 3010A, 6010C	T		2000 mL				
80-89453-A-1	80-89453-A-1 A-01-020415-1600	1311, 3010A, 6010C	(24	50.03 g	1000'6 mL	No	5.03 q	Jw 5.96	12.66 su
80-89453-A-2	(80-89453-A-2 A-01-031915-1600		E4	50,13 9	1002,6 mL	ONO	3,08 g	Jm 8.96	12.63 SU
80-89453-4-3	480-89453-A-3 A-01-040215-1505	1311, 3010A, 6010C	D)	50.11 9	1002.2 mL	No	5.03 g	Tw 5.96	12.62 su
30-89453-A-4	480-89453-A-4 A-01-050815-1600	1311, 3010A, 6010C	PAI	40.03 g	800° 6 ML	No	5.14 q	96.5 mL	12.58 su

Lab Sample ID	Client Sample ID	Method	Basis	EFD_AddHClpH>5	TYD HeatHeld	EFD Secondpuche	ExtractionFluid One	uiq	Extrac
480-270052/1		1311, 3010A, 6010C		100			No		Yes
480-89453-A-1	A-01-020415-1600	2,00	FL4	3,5 mL	Tes	12.26 SU	No		Nes
480-89453-A-2	480-89483-A-2 A-01-081915-1600	1311, 3010A, 6010C	Fig.	3.5 m2	Yes	12.13 su	No		Yes
480-89453-A-3	A-01-040215-1505	1311, 3010A, 6010C	D.	3.5 mL	Yes	12,39 SU	No		Yes
480-89453-A-4	A-01-050815-1600	1311, 3010A, 6010C	194	3.5 mL	33 de 1	12.33 SU	No		Yes
Lab Sample ID	Lab Sample ID Client Sample ID	Method Chain	Basis	VesselNumber	FiltCompDate	FiltCompTime	LeachatepH		LeachVolume
LB2 480-270052/1		1311, 3010A, 60102		Plastic	10/22/15	00:6	2.81 SU		300 mL
480-89453-A-1	A-01-020415-1600	1311, 3010A, 6010C	E4	Plastic	10/22/15	9:00	12.33 80		550 mL
480-89453-A-2	A-01-031915-1600	1311, 3010A, 6010c	ri,	Plastic	10/22/15	9:00	12,53 SU	_	500 mL

Lab Sample ID	Client Sample ID	Method Chain	Basis	ExtractFluid	
LB2 480-270052/3		1311, 3010A, 6010C		2	

5010c

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WORKSHEET	
BATCH	
METALS	

Lab Sample ID Client Sample	Client Sample ID	ID Method Chain Basis	Basis	ExtractFluid	
480-89453-A-1	A-01-020415-1600	1311, 3010A, 5010C	P.	ea	
480-89453-A-2	C	1311, 3010A, 6010C	ra,	cu	
480-89453-A-3	0.9	1311, 3010A, 5010C	Dia.	ca.	
480-89453-A-4	80-89453-A-4 A-G1-050815-1600	1311, 3010A, 6010C	(A)	.04	

	Batch Notes
IN HCI LOE #	2761430
Balance ID	8037067151
Bottle Lot Number	0229001%
pH Buffer 1 ID	2920232 (2)
pH Buffer 2 ID	2920231 (4)
pH Buffer 3 ID	2942709 (7); Second Source 3012185 (7,05)
pH Buffer 4 ID	2920230 (10)
First End time	07:50
Filter Lot #	400105-5279
pH Meter Calibration Slope	94,18
Room Temperature Thermometer ID	122273689
First Start time	15:50
TCLP Fluid 2 ID	3012619;3038066
TCLPFluid 2 pH	2,93,2,93
Maximum Temperature	21.60 Degrees ©
Minimum Temperature	21.50 Degrees C
ID number of the thermometer	122273689
Tumbler Rotations per Minute	28 NPM JS 10/21/15 Tumbler #1, Tumbler #2
Uncorrected Maximum Temperature	21,70 Degrees C
Uncorrected Minimum Temperature	21.50 Degrees @

The pound sign (*) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

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5010c

	Analyst: Sa		
Y	Batch /		
Job No.: 480-89453-1	Batch Start Date: 10/21/15 09:40	Batch, End Date:	
Lab Name: TestAmerica Buffalo SDG No.:	Batch Number: 270052	Batch Method: 1311	

Basis Description
P gcls

The pound sign (*) in the amount added Eleid denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

5010c

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Job No.: 480-89453-1 Lab Name: TestAmerica Buffalo

SDG No.:

Batch Start Date: 10/22/15

Batch Analyst: Javed, Khansa

11:30

Batch Number: 270374 Batch Method: 3010A

Batch End Date:

1967.						-	-	
50 mL	20 mL	20 mL	50 mL	20 mL	50 mL	50 mL	30 mL	20 mL
20 mT	20 m2	50 m2	50 mL	50 mi	20 mT	50 m2	70 UT	50 mL
	7.7	0,25 mL					0.25 mL	0.25 mL
		0,25 ml					0.23 mL	0.25 ml
			50 ml 55,00 ml 0,25 ml 0,25	50 mL 0,25 mL 0,25 mL 0,25 50 mL	50 mL 50 mL 50 mL 50 mL 50 mL 50 mL	50 m2 50 m2 50 m2 50 m2 50 m2 50 m2 50 m2 50 m2	50 mL 50 mL 50 mL 50 mL 50 mL 50 mL 50 mL	50 mL 50 mL 50 mL 50 mL 50 mL 50 mL 50 mL 50 mL

	Dates Notes
Batch Comment	Sylked and preserved at pH<2 Paper Lot #HC547770 8 1103
First End time	1615
Filter Paper Lot Number	30630753 (push filters)
Lot # of hydrochloric acid	2956401
Lot # of Nitric Acid	0000113071
Hor Block ID number	ū
Oven, Bath or Block Temperature 1	94.2 Degrees C
Oven, Eath or Block Temperature 2	93.0 Degrees C
pH Paper Lot Number	HC554612
Pipette ID	PN-7
First Start time	1130
ID number of the thermometer	150584583
Digestion Tube/Cup Lot #	1501179
Uncorrected Temperature	94.6 Degrees C
Uncorrected Temperature 2	93.4 Degrees C

The pound sign (*) in the amount added theid denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

5010c

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WORKSHEET
BATCH
METALS

Lab Name: TestAme	erica Buffalo	Job No.: 480-89453-1	Ĭ
SDG No.:			
Batch Number: 27037	0374	Batch Start Date: 10/22/15 11:30	Batch Analyst: Javed, Khansa
Satch Method: 301	10A	Batch End Date:	

Basis Description

The pound sign (*) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

6010C

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METALS BATCH WORKSHEET

Lab Name: TestAmerica Buffalo Job No.: 480-89453-1

SDG No.:

Batch Number: 270052

Batch Start Date: 10/21/15 09:40

Batch Analyst: Salverson, Jessica L

Batch Method: 1311

Eatch End Date:

Lab Sample ID	Lab Sample ID Client Sample ID	_	89818	Method Chain Basis InitialAmount	FinalAmount	EFL PartSizeRed	EFD SampleWeigh	EFD SampleWeigh EFD VolumeWater	EFD Initialph
LB2 480-270052/3		1311, 7470A,	1		2000 nf.				
480-89453-A-1	A-01-020415-1600	1311, 7470A, 7470A	[Xi	50.03 g	1000.6 mL	No	5.03 q	Jm 5.96	12.66 SU
480-89453-A-2	A-01-031915-1600	1311, 7470A,	124	50,13 9	1002,6 mL	ONO	5.08 g	Jm 8.96	12.63 SU
480-89453-A-3	480-89453-A-3 A-01-040215-1505	1311, 7470A,	Li.	50.11 g	1002.2 mL	No	5,03 g	Ju 5.96	12.62 su
480-89453-A-4	480-89453-A-4 A-01-050815-1600	1311, 7470A, 7470A	D	40.03 g	80016 ML	No	5.14 q	JM 5.96	12.58 su

ab Sample ID	Lab Sample ID Client Sample ID Method Chain Basis	D Method Cha	in Basis	EFP_AddHClpH>5	NED HeatHeld	EFD SecondpHChe	ExtractionFluid One	ExtractionFluid Two	PartSizeRed
LB2 480-270052/1		1311, 7470A,	ď.				No	Yes	
0-89453-A-1	480-89453-A-1 A-01-020415-1600 1311, 7470A,	7470A	a d	3,5 mL	Tes	12.26 SU	No	Yes	No ram
0-89453-A-2	480-89483-A-2 A-01-081915-1600	1311, 7470A,	R, 23	3.5 mil	Yes	12.13 su	No	Yes	Mo nun
0-89453-A-3	480-89453-A-3 A-01-040215-1505 1311, 7470A,	1311, 7470J	g is	3.5 mL	Yes	12,39 3U	No	Yes	No mm
0-89453-A-4	480-89453-E-4 A-01-050815-1600 L311, 7470A,	7470A	A, 10	3.5 mL	\$3. \$4.	12.33 SU	No	Yes	No mm
or aldwes de	Lab Sample ID Client Sample ID Method Chain) Method Cha	in Basis	VesselNumber	FiltCompDate	FiltCompTime	LeachatepH	LeachVolume	TCLP&Solids
LB2		1311, 7470A,	£,	Plastic	10/22/15	9:00	2,81 SU	900 mL	

rap sample in	rap sample to circui sample in Mernod chain Basis	Mernod Chain	Hasis	vesservumber	#11TCompusite	FILTCOMPTIME	геаспатерн	rescuvorume	TCLESSILIES
LB2 480-270052/1		1311, 7470A,		Plastic	10/22/15	00:6	2.81.80	300 mL	
480-89453-A-1	A-01-020415-1600 1311,	1311, 7470A, 7470A	P.	Plastic	10/22/15	00:6	12.33 80	250 mL	100 %
10-89453-A-2	480-89453-A-2 A-01-631915-1600 1311, 7470A,	1311, 7470A,	n,	Plastic	10/22/15	6:00	12,53 SU	500 mL	100 %
10-89453-A-3	480-89453-A-3 A-01-040215-1505 1311, 7470A,	1311, 7470A, 7470A	D ₄	Plastic	10/22/15	00:6	12.58 SU	7W 009	100 %
10-89453-A-4	480-89453-A-4 A-01-050815-1600 1311, 7470A,	1311, 7470A, 7470A	Di.	Plastic	10/22/15	9:00	12.58 su	200 mL	100 8
di Sample 1D	Lab Sample 1D Claent Sample 1D Method Chain Basis	Method Chain	Basis	ExtractFluid					
LB2 480-270082/1		1311, 7470A,		2					

The pound sign (*) in the amount added Eleid denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

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7470A

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WORKSHEE	
BATCH	
METALS	

Lab Name: TestAmerica Buffalo	Job No.: 480-89453-1	
SDG No.:		
Batch Number: 270052	Batch Start Date: 10/21/15 09:40	Batch Analyst: Salverson, Jessica L
Batch Method: 1311	Eatch End Date:	

	Batch Notes
IN HCI LOE #	2761430
Balance ID	8037067151
Bottle Lot Number	0229001X
pH Buffer 1 ID	2920232 (2)
pH Buffer 2 ID	2920231 (4)
pH Buffer 3 ID	2942709 (7); Second Source 3012185 (7,05)
pH Buffer 4 ID	2920230 (10)
First End time	07:50
Filter Lor #	400105-5279
pH Meter Calibration Slope	94,18
Room Temperature Thermometer ID	122273689
First Start time	15:50
TCLP Fluid 2 ID	301261973038066
TCLPFluid 2 pH	2,93;2,93
Maximum Temperature	21.60 Degrees C
Minimum Temperature	21.50 Degrees C
ID number of the thermometer	122273689
Tumbler Rotations per Minute	28 NPM JS 10/21/15 Tumbler #1, Tumbler #2
Uncorrected Maximum Temperature	21.70 Degrees C
Uncorrected Minimum Temperature	21.60 Degrees 3

The pound sign (*) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

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Batch Analyst: Salverson, Jessica L

The pound sign (*) in the amount added Eleid denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

7470A

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METALS BATCH WORKSHEET

Job No.: 480-89453-1

SDG No.:

Lab Name: TestAmerica Buffalo

Batch Start Date: 10/22/15 12:15

Batch Analyst: Seger, Tiffany A

Batch Method: 7470A

Batch Number: 270385

Batch End Date:

Lab Sample ID	Client Sample ID	Method Chain Basis 7470A, 7470A	100 100 100 100 100 100 100 100 100 100	InitialAmount 30 mL	FinalAmount 50 mL	MEH HG TCL? W
480-270052/1-A MB 480-270385/2		7476A, 7470A		30 mL	50 m2	
LCS 480-270385/3		7470R, 7470A		30 ML	50 m2	0.15 mL
480-89453-A-1-A	480-89453-A-1-A A-01-020415-1600	74768, 7470B	(A)	30 mL	50 ml.	
480-89453-A-2-A	480-89453-A-2-A A-01-031915-1600	7470A, 7470A	Day	30 mL	50 mi	
480-89453-A-3-A	480-89453-A-3-A A-01-040215-1505	7470A, 7470A	P.	30 mL	20 nT	
480-89453-A-4-A	480-89453-A-4-A A-01-050815-1600	7470A, 7470A	ra.	30 mL	50 mZ	
480-89453-A-4-A	480-89453-A-4-A A-01-050815-1600	-	A	30 mL	50 mL	0.15 mL
480-89453-A-4-A	480-89453-A-4-A A-01-050815-1600	7470A, 7470A	D)	30 mL	50 mL	0.15 mL

	Batch Notes
Hydroxylamine Hydrochloride Lot	3032375
Batch Comment	dal Batch: 270301
Digestion End Time	1415
Digestion Start Time	1215
Sulfuric Acid Lot Number	3014228
Lot # of Mitric Acid	3021848
Not Block ID number	HG-A
Potassium Persulfate Lot Number	3011385
Potassium Fermanganate Lot Number	3021103
Oven, Bath or Block Temperature 1	95.5 Celsius
Pipette ID	HGL-4 @ 1025 10/22/2015
Stannous Chioride Lot Number	3036153
ID number of the thermometer	S/N52942
Digestion Tube/Cup Lot #	1501179
Uncorrected Temperature	95,0 Celsius

The pound sign (*) in the amount added Eleid denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

7470A

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Lab Name: TestAmerica Buffalo SDG No.:	Batch Number: 270385	Batch Method: 7470A	asie Basie Description	E TOTE
Job No.: 480-89453-1	Batch Start Date: 10/22/15 12:15	Batch End Date:		
	Batch Analyst: Seger, Tiffany			

The pound sign (*) in the amount added Eleid denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this teagent.

7470A

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METALS BATCH WORKSHEET

Lab Name: TestAmerica Buffalo Job No.: 480-89453-1

SDG No.:

Batch Start Date: 10/21/15 15:00 Batch Analyst: Seger, Tiffany A

Batch Method: 7471B

Batch Number: 270135

Batch End Date:

Method Chain Basis IntialAmount FinalAmount MED SRM 1085 MEH 3432 MKG 00002 7471B +0.5937 g 50 mL +0.0239 g 7471B +0.0239 g 50 mL +0.0239 g	+0.5970 g 50 ml	+0.5942 g 50 mZ	+0.5954 g 50 mi	7m 05	+0.5921 g 50 ml	
MED SRM D085 00002 +0.0239 g	20 mZ	50 mZ	20 mZ	20 mZ	50 mZ	
MEH 1952 N 01023						
KG.		S mL	Jm. c			

	Batch Notes
Hydroxylamine Hydrochloride Lot.	3032375
Balance ID	25850472
Batch Comment	Cal Batch: 270075
Blank Soil Lot Number	3033791
Digestion End Time	1530
Digestion Start Time	1500
Lot # of hydrochlotic acid	3021075
Lot # of Nitric Acid	3021845
Hot Black ID number	H-5-H
Potassium Permanganate Lot Number	3021103
Oven, Bath or Block Temperature 1	95.5 Celsins
Pipette ID	B-75H
Stannous Chloride Lot Number	3011365
ID number of the thermometer	S/N52492
Digestion Tube/Cup Let #	1501179
Uncorrected Temperature	95,0 Celsius

The pound sign (*) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

7471B.

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METALS BATCH WORKSHEET

Lab Name: TestAmerica Buffalo SDG No.:	Job No.: 480-89453-1	T
Batch Number: 270135	Batch Start Date: 10/21/15 15:00	Batch Analyst: Seger, Tiffany A
Batch Method: 7471B	Batch End Date:	
asie Basis Description		

The pound sign (*) in the amount added Eleid denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this teagent.

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7471B.

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Job No.: 480-89453-1 Lab Name: TestAmerica Pittsburgh

Batch Number: 159790 SDG No.:

Batch Analyst: Hartsock, Bobbi M Batch Start Date: 11/09/15 12:50

Batch End Date: 11/09/15 14:50 Batch Method: 3050B

MTAPITTMSC 00033 I mE I. mī. MTAPITTMSA 00027 1 mL 1 mL WTAPITTICPMS 00022 1 mc 1 mil FiralAmount 100 mL 100 mL 100 mL 100 mL 100 mL 100 mL 100 mL InitialAmount 00001,04 g 000001.02 g 000001.04 g 000001+05 g 900001,04 q 5 TO. 10000 000001.04 g RUN CALC NOT SET TO RUN RUN
CALC NOT SET TO
RUN
CALC NOT SET TO
RUN
CALC NOT SET TO
CALC NOT SET TO CALC NOT SET TO RUN CALC NOT SET TO Calcheg Lab Sample ID Client Sample ID Method Chain Basis 3050B, 6020A A-01-031915-1600 3050B, 6020B A-01-050815-1600 3050B, 6020A 3050B, 6020A 3050B, 6020A A-01-020415-1600 3050B, 6020A A-01-040215-1505 3050B, 6020A MB 180-159790/I LCS 180-159790/2 LCSD 180-159790/3 480-89453-A-1 480-89453-A-4 480-89453-A-2 480-89453-A-S

D.	Batch Notes
Balance ID	P1856710
Batch Comment	Netals C3
Blank Soil Lot Number	1736518
First End time	1450
Filter Paper Lot Number	9664849
Hydrogen peraxide Lot number	10ml 1776515
Lot # of hydrochloric acid	10ml 1779189
Legbook ID for diluted Mitric	10ml 1775088
Lot # of Nitric Acid	Sml 1734536
Hot Block ID number	HB11
Oven, Bath or Slock Temperature 1	SEC Degrees C
Pipette ID	11201511U
Person's name who witnessed reagent drop	BMH
Perform Calculation (U=No, 1=Yes)	0
First Start time	1250
ID number of the thermometer	IE3-14-METALS CF0.0 C1
Digestion Tube/Cup Lot #	1504103
Uncorrected Temperature	95C Celsius

The pound sign (*) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

6020A

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ica Pitesburgh Job No.: 480-89453-1	9790 Batch Start Date: 11/09/15 12:50 Batch Analyst: Hartsock, Bobbi	Batch End Date: 11/09/15 14:50
Lab Name: TestAmerica SDG No.:	Batch Number: 159	Satch Method: 3050B

Sasie D	Description
---------	-------------

The pound sign (*) in the amount added Eleid denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

6020A

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GENERAL CHEMISTRY

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COVER PAGE GENERAL CHEMISTRY

ab Name	: TestAmerica Pittsburgh	Job Number: 480-89453-1					
DG No.:							
	: Cerl Gasifier - Research Project						
	Client Sample ID	Lab Sample ID					
	A-01-020415-1600	480-89453-1					
	A-01-031915-1600	180-89153-2					
	A-01-040215-1505	480-89453-3					
	A-01-050815-1600	480-89453-4					

Comments:

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9-IN DETECTION LIMITS GENERAL CHEMISTRY

Lab Name: TestAmerica Pittsburgh	Job Number: 480-89453-1
SDG Number:	
Matrix: Solid	Instrument ID: NOEQUIP
Method: 2540G	RL Date: 01/31/2010 13:27

Analyte	Wavelength/ Mass	(RL)	
Percent Moisture		0.1	
Percent Solids		0.1	

FORM IX - IN

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9-IN CALIBRATION BLANK DETECTION LIMITS GENERAL CHEMISTRY

Lab Name: TestAmerica Pittsburgh	Job Number: 480-89453-1
SDG Number:	N
Matrix: Solid	Instrument ID: NOEQUIP
Method: 2540G	XRL Date: 01/31/2010 13:31

Analyte	Wavelength/ Mass	XRL (%)	
Percent Moisture		0.1	
Percent Solids		0,1	

FORM IX - IN

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13-IN ANALYSIS RUN LOG GENERAL CHEMISTRY

Lab Name: TestAmerica Pittsburgh Job No.: 480-89453-1

SDG No.:

Instrument ID: NOEQUIP Method: 2540G

Start Date: 10/27/2015 08:35

End Date: 10/27/2015 08:35

						Analytes
Lab Sample ID	D T		Time	\$ S O 1	Moist	
ZZZZZZ			08:35	1		
22222			08:35			
ZZZZZZ			08:35			
ZZZZZZ			08:35			
IZZZZZ			08:35	+		
222222			08:35	+		
ZZZZZZ			08:35	_		
ZZZZZZ			08:35			
480-89453-1	1	T	08:35	Х	X	
480-89453-2	1	T	08:35	X.	X	
480-89453-3	1	T	08:35	X	X	
480-89453-4	1	T	08:35	- 8	X	
ZZZZZZ			08:35			
ZZZZZZ			08:35	+-		
222222			08:35	1		
22222			08:35			
ZZZZZZ			08:35			
ZZZZZZ			08:35			
ZZZZZZ			08:35			
222222			08:35			

Prep Types T - Total/NA

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GENERAL CHEMISTRY BATCH WORKSHEET

Job No.: 480-89453-1 Lab Name: TestAmerica Pittsburgh

SDG No.:

Batch Start Date: 10/27/15

Batch Analyst: Loheyde, Cheryl

08:35

Batch Method: 2540G

Batch Number: 158347

Batch End Date:

SampleMassDry	5.52 g	6.12 9	£ 523 B	5,00 g
SampleMassWet	5.87 9	6.12 9	£ 53 d.	5.02 g
DishWeight	2.56 g	2,51 g	2,48 g	2.48 g
DISH#	v3259 0.1188	AwObr 0.1266	Awo14 0.1120	Aw018 0.1125
Basis	4.	E-	4	II.
and Method Chain Basis	25405	25405	1509 2540G	25406
Client Sample	A-01-020415-1500	A-01-031915-1600 25	1.7	A-01-050815-1600
Lab Sample ID	A-1	480-89453-A-2	480-89453-A-3	480-85453-A-4

Balance ID 1126472457 No Unit Date and Time Samples in Desiccator 10/28/15 04:45 Date and Time Samples out of Desiccator 10/28/15 05:45 Date samples were placed in the oven 10/27/15 Oven Temp when samples are put in oven 104.5 Degrees C Time samples were place in the oven 09:40 Date samples were removed from oven 10/28/15 Oven Temp when samples removed from oven 10/4.5 Degrees C Oven Temp when samples removed from oven 04:45 Oven Temp when temporature 5005 ID number of the thermometer NET 34 Uncorrected in Temporature 105 Celesius	Batch Notes
10/28/15 10/28/15 10/27/15 104.5 Degr 09:40 10/28/15, 10/38/15, 04:45 5005 105 Celest	1126472457 No Unit
10/28/15 05:4 10/27/15 104.5 Degrees 09:40 104.5 Degrees 04:45 5005 WET 34 105 Celsins	10/28/15
10/27/15 104.5 Degrees 09:40 10/28/15 50 50 50 105 Celsins	10/28/12
104.5 Dagrees 09.40 107.8/15 104.5 Degrees 04.45 50.05 WEY 34 105 Celeins	
09:40 10/28/15 104.5 Degrees 04:45 5005 MET 34 105 Celeins	104,5 Degrees
10/28/15 104.5 Degrees 04:45 5005 WET 34 105 Celsins	
04:45 Degrees 04:45 5005 WET 34 105 Celsins	
5008 WET	104.5 Degrees
5000 WET	
WET 105	5005
105	WET 34
	105 Celsius
Uncorrected Out Temperature 105 Celsius	

Description	
Basis	L/NA
	Total
Basis	£4

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The pound sign (*) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

2540G

401

Subcontract Data

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Shipping and Receiving Documents

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Amherst, NY 14228-2298 Phone (716) 691-2600 Fax (716) 691-7991	O	Chain of Custody Record	of Cus	tody Ke	cord			THE LEASE OF SEVEROPHENTAL TESTING
	Sampler		ľ	Lab PW	Lab PM:			OC No.
Client Information (Sub Contract Lab)	Phone:			Fisch	r, Brian J	460 004E3 Chain of Custody	Custody	180-26416,1
Shipping/Receiving		3		brian.	brian.fischer@testar			age 1 of 1
Company: TestAmerica Laboratories, Inc.						Analysis Requested	sted	ulob #: 480-89453-1
Address: 301 Alma Deias PIDC Bark	Oue Date Requested:			1300	210			ion Code
3	TAT Requested (days):	ak:	ŀ					A HCL M. Haxaria
Pittsburgh	Ī			46:50				2 0
PA, 15238				(E) 77	3.00			x
Phone: 412-963-7058(Tel) 412-963-2468(Fax)	#Od	ζ		oge mig	n 1-		,,2	G-Amchler S-H2SO4
Emailt	WO#			200	(10)			I - los J - DI Water
Project Name: Cerl Gastfier - Research Project	Project # 48012846				Juoje		919	K-EDTA
- A. C.	#MOSS			Ense	Web		P	Other
Servito Identification - Client ID (Lab ID)	Sample Date	Sample	Sample Type (C=comp.	Matrix (www.	SOSOPISOPOB BC Note this Wall of the Control of the		* :	Special Instructions/Note:
こうしょう こうしょう こうしょう こうしょう はんない 大学 のない こうしょう しょうしょう しょうしょう しょうしょう しょうしょう しょうしょう しゅうしゅう しゅう	集	16:00	Presenta	MAN	×			
A-01-020415-1600 (480-89453-1)	2/4/15	Eastern		Solid	×	×		
A-01-031915-1600 (480-89453-2)	3/19/15	16:00 Fastem		Solid	×	×		
A-01-040215-1505 (480-39453-3)	40/15	15:05 Eastern		Solid	×	×	+	
A-01-050815-1600 (480-89453-4)	5/8/15	16:00 Fastern		Solid	×	×		
Possible Hazard Identification					Sample D	sposal (A fee may be asse	ssed if samples are rel	ger than 1 mo
Unconstituted Deliverable Requested: I. II., III, IV, Other (specify)					Special Ins	Special Instructions/QC Requirements:		Anchive For Months
Empty Kit Relinquished by		Date:			Time:		Method of Shipment	A. A. C.
Resignation by Clark	1/1-4/0/	n	001	SHE	Receive	"Notary	Ostra/Ternes	July STOR
Relinquished by:	Date/Ime			Company	Recorded by	, Aug	DateTime	& Company
1	Calevione			Company	NGGSNG.	of the state of th		Acurbany
Custody Seals Intact Custody Seal No.:					Cooler	Cooler Temperature(s) "C and Other Remarks:	Si .	

Login Sample Receipt Checklist

Client: U.S. Army Construction Engineering Resea

Login Number: 89453 List Source: TestAmerica Buffalo

Job Number: 480-89453-1

List Number: 1

Creator: Kinecki, Kenneth P

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	
Cooler Temperature is acceptable	False	
Cooler Temperature is recorded.	True	
COC is present.	False	Filled out by TA Buffalo
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information	True	
Is the Field Sampler's name present on COC7	False	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	False	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	Imbedded in the sample ID's
Appropriate sample containers are used.	False	Canning Jars
Sample bottles are completely filled.	False	
Sample Preservation Verified	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	False	Samople -04 contains 59 grams
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	True	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present	True	
Samples do not require splitting or compositing.	True	
Sampling Company provided.	True	USACE
Samples received within 48 hours of sampling.	True	
Samples requiring field filtration have been filtered in the field.	N/A	
Chlorine Residual checked.	N/A	

TestAmerica Buffalo Page 165 of 166 11/11/2015

Login Sample Receipt Checklist

Client: U.S. Army Construction Engineering Resea

Login Number: 89453 List Number: 2

Creator: Watson, Debbie

List Source: TestAmerica Pittsburgh List Creation: 10/22/15 03:02 PM

Job Number: 480-89453-1

Question	Answer Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td>	True
The cooler's custody seal, if present, is intact.	True
Sample custody seals, if present, are intact.	True
The cooler or samples do not appear to have been compromised or tampered with.	True
Samples were received on ice.	True
Cooler Temperature is acceptable	True
Cooler Temperature is recorded.	True
COC is present.	True
COC is filled out in ink and legible.	True
COC is filled out with all pertinent information	True
Is the Field Sampler's name present on COC?	True
There are no discrepancies between the containers received and the COC	True
Samples are received within Holding Time.	True
Sample containers have legible labels.	True
Containers are not broken or leaking	True
Sample collection date/times are provided.	True
Appropriate sample containers are used.	True
Sample bottles are completely filled.	True
Sample Preservation Verified.	True
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True
Multiphasic samples are not present.	True
Samples do not require splitting or compositing	True
Residual Chlorine Checked	N/A

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Appendix G: Analyses of Condensate and Pyro Oil



ANALYTICAL REPORT

Job Number: 480-89467-1

Job Description: Cerl Gasifier - Research Project

For: U.S. Army Construction Engineering Resea 2902 Newmark Drive Champaign, IL 61822

Attention: Mr. Stephen Cosper

0 .

Approved for release
Joe V Discourages
Project Management Assessment
11712/0018 5 04 PM

Designee for

Brian J Fischer, Manager of Project Management 10 Hazelwood Drive, Amherst, NY, 14228-2298 (716)504-9835 brian.fischer@testamericainc.com 11/13/2015

The test results in this report meet all NELAP requirements for analytes for which accreditation is required or available. Any exceptions to the NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory. All questions regarding this test report should be directed to the TestAmerica Project Manager who has signed this report.

TestAmerica Buffalo NELAC Certifications: CADPH 01169CA, FLDOH E87672, ILEPA 200003, KSDOH E-10187, LADEQ 30708, MDH 036-999-337, NHELAP 2973, NJDEP NY455, NHDOH 10026, ORELAP NY200003, PADEP 68-00281, TXCEQ T-104704412-10-1

TestAmerica Laboratories, Inc.

TestAmenca Buffalo 10 Hazelwood Drive, Amherst, NY 14228-2298 Tel (716) 691-2600 Fax (716) 691-7991 www.testamencainc.com 11/13/2015

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Job Narrative 480-89467-1

Receipt

The samples were received on 10/20/2015 9:20 AM, the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 20.0° C

Receipt Exceptions

Samples for 8021 analyses were pre-diluted in sample control by a DF of 40.

Samples for 8270 analyses were pre-diluted in sample control by a DF of 100.

GC/MS VOA

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

GC/MS Semi VOA

Method(s) 8270D: The following samples required a dilution due to the nature of the sample matrix: OS-01-042815-1600 (480-89467-16) and OS-01-101514-0910 (480-89467-22). Because of this dilution, the surrogate spike concentration in the sample was reduced to a level where the recovery calculation does not provide useful information.

Method(s) 8270D: The following samples were diluted due to viscosity: OS-01-031815-1530 (480-89467-14), OS-01-042415-1600 (480-89467-15), OS-01-042815-1600 (480-89467-16), OS-01-050715-1630 (480-89467-17) and OS-01-101514-0910 (480-89467-22). Elevated reporting limits (RL) are provided.

Method(s) 8270D. The following samples were diluted due to the nature of the sample matrix: WW-02-030515-1557 (480-89467-2), WW-01-030515-1352 (480-89467-5), WW-01-030515-1352 (480-89467-5), WW-01-050715-1600 (480-89467-8), P-01-030515-1557 (480-89467-10), P-01-051315-1530 (480-89467-13), P-01-101514-0910 (480-89467-18), P-01-100814-1120 (480-89467-19) and P-01-013015-0915 (480-89467-20). As such, surrogate recoveries are below the calibration range or are not reported, and elevated reporting limits (RLs) are provided.

Method(s) 8270D: The following samples were diluted due to the abundance of target analytes: WW-01-042815-1600 (480-89467-6), WW-01-050715-1600 (480-89467-8) and P-01-013015-0915 (480-89467-20). As such, surrogate recoveries are below the calibration range or are not reported, and elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC VOA

Method(s) 8021B. The following samples were analyzed outside of analytical holding time due to analysis request date outside of holding time. WW-01-101514-1120 (480-89467-1), WW-01-031915-1550 (480-89467-3), WW-01-041415-1640 (480-89467-4), WW-01-050615-1552 (480-89467-7), WW-01-050615-1552 (480-89467-7), WW-01-050615-1552 (480-89467-11), P-01-040115-1600 (480-89467-21), P-01-012215-0948 (480-89467-23) and WW-01-031315-1531 (480-89467-24).

Method(s) 8021B: The following samples were diluted to bring the concentration of target analytes within the calibration range: WW-01-101514-1120 (480-89467-1), WW-01-031915-1550 (480-89467-3), WW-01-041415-1640 (480-89467-4), WW-01-050615-1552 (480-89467-1), WW-01-052015-1500 (480-89467-9), P-01-031315-1531 (480-89467-11), P-01-050615-1552 (480-89467-12), P-01-040115-1600 (480-89467-21), P-01-012215-0948 (480-89467-23) and WW-01-031315-1531 (480-89467-24). Elevated reporting limits (RLs) are provided.

Method(s) 8021B. The recovery of the one surrogate in samples WW-01-031315-1531 (480-89467-24) exceeds quality control limits due to the sample matrix. The recovery of the secondary surrogate is within quality control criteria; no corrective action is required.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page

Organic Prep

Method(s) 3510C: The following samples was prepared outside of preparation holding time: WW-02-030515-1557 (480-89467-2), WW-01-030515-1352 (480-89467-5), WW-01-030515-1352 (480-89467-5), WW-01-042815-1600 (480-89467-6), WW-01-050715-1600 (480-89467-8), P-01-030515-1557 (480-89467-10), P-01-051315-1530 (480-89467-13), P-01-101514-0910 (480-89467-18), P-01-100814-1120 (480-89467-19) and P-01-013015-0915 (480-89467-20).

Method(s) 3580A: The following samples were prepared outside of preparation holding time due to test added after holding time expired: OS-01-031815-1530 (480-89467-14), OS-01-042415-1600 (480-89467-15), OS-01-042815-1600 (480-89467-16), OS-01-050715-1630 (480-89467-17) and OS-01-101514-0910 (480-89467-22).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page

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GC/MS SEMI VOA MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Buffalo	Job No.:			
SDG No.:				
Instrument ID: HP5973V	Analys	Analysis Batch Number: 271208		
Lab Sample ID: IC 480-271208/3	Client	Client Sample ID:		
Date Analyzed: 10/26/15 19:36	Lab Fi	File ID: V53780.D	GC Column: RXI-58il MS	ID: 0.25 (mm)
COMPOUND NAME	RETENTION	177		
	TIME	REASON	DATE	
Benzoic acid	7.65			
Indeno[1,2,3-cd]pyrene	18.23	Incomplete Integration	richardsd 10/27/15 10:23	
Lab Sample ID: ICIS 480-271208/6	Client	Client Sample ID:	H	
Date Analyzed: 10/26/15 21:04	Lab File	le ID: V53783.D	GC Column: RXI+5Sil MS	ID: 0.25 (mm)
COMPOUND NAME	RETENTION		MANUAL INTEGRATION	
	TIME	REASON	ANALYST DATE	
Caprolactam	8.30	Incomplete Integration	richardsd 10/27/15 10:26	
Lab Sample ID; IC 480-271208/7	Client	Client Sample ID:		
Date Analyzed: 10/26/15 21:33	Lab Fi	Lab File ID: V53784.D	GC Column: RXI-5811 MS	ID: 0.25 (num)
COMPOUND NAME	RETENTION	MANUAL I	INTEGRATION	
	TIME	REASON	ANALYST DATE	
Caprolactam	8.32	Incomplete Integration	richardsd 10/27/15 10:28	
Lab Sample ID: IC 480-271208/8	Client	Client Sample ID:		
Date Analyzed: 10/26/15 22:02	Lab Fi	File ID: V53785.D	GC Column: RXI-5Sil MS	ID: 0.25 (mm)
COMPOUND NAME	RETENTION	MANUAL	INTEGRATION	
	TIME	REASON	ANALYST DATE	
Caprolactam	8.32	Incomplete Integration	richardsd 10/27/15 10:28	
Lab Sample ID: IC 480-271208/9	Client	Client Sample ID:		
Date Analyzed: 10/26/19 22:31	Lab Fi	File ID: V53786.D	GC Column: RXI-5Sil MS	ID: 0.25 (mm)
COMPOUND NAME	RETENTION	MANUAL I	INTEGRATION	
	TIME	REASON	ANALYST DATE	
Caprolactam	8.33	Incomplete Integration	richardsd 10/27/15 10:28	

82700

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8270D

Job No.: 480-89467-1 Lab Name: TestAmerica Buffalo

Analysis Batch Number: 273999 Instrument ID: HP5973V SDG No.:

Client Sample ID: Lab Sample ID: CCVIS 480-273999/3

Date Analyzed: 11/10/15 11:07	Lab Fi	Lab File ID: V60002.D	GC Colum	GC Column: RXI-58il MS ID: 0.25(mm)	ID:	0.25 (mm)
COMPOUND NAME	RETENTION	MANUAL INTEGRATI	PEGRATION			
	TIME	6	ANALYST	DATE		
4-Chloroaniline	7.96	Peak Tail	richardsd	11/10/15 12:44		
Pentachlorophenol	10.52	10.52 Peak Tail	richardsd	11/10/15 12:44		

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GC/MS SEMI VOR MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Bullalo	JOD NO	Job No.: 480-89467-1				
SDG No.:						
Instrument ID: HP5973V	Analys	Analysis Batch Number: 274392				
Lab Sample ID: CCVIS 480-274392/	80-274392/3 Client Sample ID:	Sample ID:				
Date Analyzed: 11/11/15 12:49		Lab File ID: V60044.D	GC Column	GC Column: RXI-58il MS ID: 0.25(mm)	ID:	0.25 (mm)
COMPOUND NAME	RETENTION	MANUAL IN	MANUAL INTEGRATION			
	TIME	REASON	ANALYST	DATE		
4-Chloroaniline	7,95	Baseline	richardsd	richardsd 11/11/15 14:14		
Pentachlorophenol	10.51	10.51 Peak Tail	richardsd	richardsd 11/11/15 14:14		

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SDS No.:					
Instrument ID: HP5973X	Analys	Analysis Batch Number: 270613			
Lab Sample ID: IC 480-270613/3	Client	Client Sample ID:			
Date Analyzed: 10/23/15 08:33	Lab	File ID: X009013899.D	BC Colu	GC Column: RXI-5811 MS	ID: 0.25 (mm)
COMPOUND NAME	RETENTION	MANUAL I	MANUAL INTEGRATION		
	TIME	REASON	ANALYST	DATE	
Benzoic acid	7.88	Assign Peak	WOLFL	10/26/15 16:12	
Lab Sample ID: IC 480-270613/4	Client	Client Sample ID:			
Date Analyzed: 10/23/15 09:00	Lab File	le ID: X009013900.D	GC Colu	GC Column: RXI-5Sil MS	ID: 0,25 (num)
COMPOUND NAME	RETENTION	MANUAL I	MANUAL INTEGRATION		
	TIME	REASON	ANALYST	DATE	
Benzoic acid	7.90	Assign Peak	WolfL	10/26/15 16:13	
Lab Sample ID: ICIS 480-270618/5	Client	Client Sample ID:			
Date Analyzed: 10/23/15 09:27	Lab Fi	Lab File ID: X009013901.D	GC Colu	GC Column: RXI-5Sil MS	ID: 0.25 (mm)
COMPOUND NAME	RETENTION	MANUALI	INTEGRATION		
	TIME	REASON	ANALYST	DATE	
Benzoic acid	7,93	Assign Peak	WolfL	10/26/15 16:04	
Caprolactam	8.75	Poor chromatography	Wolth	10/26/15 16:04	
Lab Sample ID: IC 480-270513/6	Client	Client Sample ID:			
Date Analyzed: 10/23/15 09:54	Lab File	le ID: X009013902.D	GC Column:	mn: RXI-5Sil MS	ID: 0.25 (mm)
COMPOUND NAME	RETENTION		MANUAL INTEGRATION		
	TIME	REASON	ANALYST	DATE	
Benzoic acid	7.96	Assign Peak	WOLFL	10/26/15 16:07	
Caprolectam	8.77	Poor chromatography	WolfL	10/26/15 16:07	

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Instrument ID: HE5973X	Lab Name: TestAmerica Buffalo SDS No.:	Job No.:	44				
Citient Sample ID:	Instrument ID: HE5973X	Analys	is Batch Number: 270613				
10:21	Lab Sample ID: IC 480-270613/7	Client	Sample ID:				
RETENTION		Lab E	le ID: X009013903.D	GC Colu	m: RXI-5811 MS	ID:	ID: 0.25 (mm)
TINE REASON ANALYST DATE	COMPOUND NAME	RETENTION	MANUAL	NTEGRATION			
7.96 Assign Peak WolfL 10/26/15 16:08 70613/8 Client Sample ID: 10:48 Lab File ID: X009013904.D GC Column: RXI-5Sil MS E RETENTION REASON ANALYST DATE 7.97 Assign Peak REASON WolfL 10/26/15 16:10 8.78 Poor chromatography WolfL 10/26/15 16:10		TIME	REASON	ANALYST	DATE		
70613/8 Client Sample ID: 10:48 Lab File ID: X009013904.D GC Column: RXI-5Sil MS E RETENTION REASON ANALYST DATE 7.97 Assign Peak WolfL INTEGRATION DATE 7.97 Assign Peak WolfL 10/26/15 16:10 8.78 Poor chromatography WolfL 10/26/15 16:10	Benzoic acid	7.96	Assign Peak	WolfL	10/26/15 16:08		
70613/8 Client Sample ID: 10:48 Lab File ID: X009013904.D GC Column: RXI-5Sil MS E RETENTION MANUAL INTEGRATION DATE 7.97 Assign Peak WolfL 10/26/15 16:10 8.78 Poor chromatography WolfL 10/26/15 16:10	Caprolactam	8.77	Poor chromatography	WolfL	10/26/15 16:08		
10:48	Lab Sample ID: IC 480-270613/8	Client	Sample ID:				
OMPOUND NAME RETENTION REASON ANALYSE ANALYSE ANALYSE Wolft B.78 Poor chromatography Wolft Wolft		Lab Fi	le ID: X009013904.D	GC Colur		ij	ID: 0.25 (mm)
d. 7.97 Assign Peak WolfL 8.78 Poor chromatography WolfL	COMPOUND NAME	RETENTION	MANUAL	NTEGRATION			
d. 7.97 Assign Peak WolfL 8.78 Poor chromatography WolfL		TIME	REASON	ANALYST	DATE		
8.78 Poor chromatography WolfL	Benzoic acid	7.97	Assign Peak	Wolfl	10/26/15 16:10		
	Caprolactam	8.78	Poor chromatography	WolfL	10/26/15 16:10		

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SC/MS SEMI VOA MANUAL INTEGRATION SUMMARY

TIME REASON ANALYST DATE	SDG No.:	ID: 0.25(mm)	RXI-5811 MS	GC Column: EGRATION ANALYST	-1. 14095.E	Analys Client Lab Fi RETENTION	estAmerica Buffalo ID: HP5973X ID: CCVIS 480-273506/3 ed: 11/05/15 10:42 COMPOUND NAME	Lab Name: TestAmerica SDS No.: Instrument ID: HP5973 Lab Sample ID: CCVIS Date Analyzed: 11/05/
	: HP5973X. Analysis Batch Number: 273506 : CCVIS 480-273506/3 Client Sample ID: : 11/05/15 10:42 Lab File ID: X009014095.D GC Colum MEDUND NAME RETENTION TIME REASON MANUAL INTEGRATION TIME TIME		11/06/15 07:52	Wollett.	7.98 Assign Peak	80.7	101	Benzoic acid
	Analysis Batch Number: 273506 CCVIS 480-273506/3 Client Sample ID: 11/05/15 10:42 Lab File ID: X009014095.D		-	EGRATION	MANUAL IN	RETENTION	COMPOUND NAME	0
AME RETENTION	4P5973% Analysis Batch Number: 273506 3CVIS 480-273506/3 Client Sample ID: 11/05/15 10:42 Lab File ID: X009014095.D					-		
AME RETENTION MANUAL IN	4P5973X CCVIS 480-273506/3	ID: 0.25 (mm)	RXI-5811 MS	GC Column	le ID: X009014095.D	Lab Fi	11/05/	Date Analyze
11/05/15 10:42	1P5973X				Sample ID:	Client	SIVOC	Lab Sample I
OCVIS 480-273506/3 Client Sample ID: 11/05/15 10:42 Lab File ID: X009014095.D OUND NAME RETENTION MANUAL INT					is Batch Number; 273506	Analys		Instrument I
Analysis Batch Number: 273506 3CVIS 480-273506/3 Client Sample ID: 11/05/15 10:42 Lab File ID: X009014095.D MANUAL INT				ì	.: 480-89467-1	Job No	estAmerica Buffalo	Lab Name: Te

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GC VOA MANUAL INTEGRATION SUMMARY

Job No.:

Lab Name: TestAmerica Buffalo

Instrument ID: HF5890-3	Analys	Analysis Batch Number: 262944			
Lab Sample ID: STD1 480-262944/2 IC		Client Sample ID:			
Date Analyzed: 09/10/15 17:44	Lab File	le ID: 3 67061.D	GC Colu	GC Column: RIX-VGC	ID: 0.53 (mm)
COMPOUND NAME	RETENTION	MANUAL	MANUAL INTEGRATION		
	TIME	REASON	ANALYST	DATE	
a,a,a-Trifluorotoluene	4.41	Baseline Smoothing	Iarsonj	11:80 8:11/10	
Toluene	5.16	Baseline Smoothing	larsonj	09/11/15 08:37	
n-Propylbenzene	10.83	Baseline Smoothing	larsonj	09/11/15 08:11	
1,3,5-Trimethylbenzene	11,50	Baseline Smoothing	larsonj	09/11/15 08:11	
Lab Sample ID: STD1 480-262944/2	IC Client	Client Sample ID:			
Date Analyzed: 09/10/15 17:44	Lab File	lle ID: 3 67061.D	GC Colu	GC Column: RIX-VGC	ID: 0.53 (mm)
COMPOUND NAME	RETENTION	MANUAL	MANUAL INTEGRATION		
	TIME	REASON	ANALYST	DATE	
Toluene	6,35	Baseline Smoothing	larsonj	09/11/15 08:37	
Naphthalene	18.42	Split Beak	larsonj	09/11/15 08:18	
Lab Sample ID: STD2 480-262944/3	IC Client	Client Sample ID:			
Date Analyzed: 09/10/15 18:16	Lab Fi	Lab File ID: 3 67062.D	GC Colu	GC Column: RTX-VGC	ID: 0.53 (mum)
COMPOUND NAME	RETENTION	MANUAL	INTEGRATION		
	TIME	REASON	ANALYST	DATE	
n-Propylbenzene	10.82	Baseline Smoothing	larsonj	09/11/15 08:17	
Lab Sample ID: STD2 480-262944/3	IC Client	Client Sample ID:			
Date Analyzed: 09/10/15 18:16	Lab File	le ID: 3 67062.D	GC COLU	GC Column: RTX-VGC	ID: 0,53(mm)
COMPOUND NAME	RETENTION	MANUAL	MANUAL INTEGRATION		
	TIME	REASON	ANALYST	DATE	
Naphthalene	18.42	Split Peak	larsonj	71:80 61/11/60	

8021E

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Instrument ID: HE5890-3 Lab Sample ID: STD3 480-262944/4 Date Analyzed: 09/10/15 18:48 COMPOUND NAME Lab Sample ID: STD3 480-262944/4 Date Analyzed: 09/10/15 18:48 COMPOUND NAME n-Butylbenzene Lab Sample ID: STD4 480-262944/5 Date Analyzed: 09/10/15 19:20 COMPOUND NAME 180gropylbenzene 180gropylbenzene 4-Bromofluorobenzene 4-Bromofluorobenzene 4-Bromofluorobenzene 180gropylbenzene					
Lab Sample ID: STD3 480-26294 Date Analyzed: 09/10/15 18:48 COMPOUND NAME Isopropylbenzene Lab Sample ID: STD3 480-26294 Date Analyzed: 09/10/15 18:48 COMPOUND NAME Lab Sample ID: STD4 480-26294 Date Analyzed: 09/10/15 19:20 COMPOUND NAME Isopropylbenzene 4-Bromofluorobenzene 4-Bromofluorobenzene h-Propylbenzene	Analys	Analysis Batch Number; 262944			
Date Analyzed: 09/10/15 18:48 COMPOUND NAME Isopropylbenzene Lab Sample ID: STD3 480-26294 Date Analyzed: 09/10/15 18:48 COMPOUND NAME n-Butylbenzene Lab Sample ID: STD4 480-26294 Date Analyzed: 09/10/15 19:20 COMPOUND NAME Isopropylbenzene 4-Bromofluorobenzene n-Propylbenzene n-Propylbenzene	ZI.	Client Sample ID:			
Isopropylbenzene n-Propylbenzene Lab Sample ID: STD3 480-26294 Date Analyzed: 09/10/15 18:48 COMPOUND NAME n-Butylbenzene Lab Sample ID: STD4 480-26294 Date Analyzed: 09/10/15 19:20 COMPOUND NAME Isopropylbenzene 4-Bromofluorobenzene n-Propylbenzene	S Lab File	Le ID: 3 67063.D	BC Colu	GC Column: RIX-VGC	ID: 0.53 (mm)
Isopropylbenzene Lab Sample ID: STD3 480-26294 Date Analyzed: 09/10/15 18:48 COMPOUND NAME Lab Sample ID: STD4 480-26294 Date Analyzed: 09/10/15 19:20 COMPOUND NAME Isopropylbenzene A-Bromofluorobenzene A-Bromofluorobenzene	RETENTION	TY L	MANUAL INTEGRATION	awara	
Isopropylbenzene n-Propylbenzene Lab Sample ID: STD3 480-26294 Date Analyzed: 09/10/15 18:48 COMPOUND NAME n-Butylbenzene Lab Sample ID: STD4 480-26294 Date Analyzed: 09/10/15 19:20 COMPOUND NAME Isopropylbenzene 4-Bromofluorobenzene n-Propylbenzene	THE	- 11	ANALIST	DATE	
Lab Sample ID: STD3 480-26294 Date Analyzed: 09/10/15 18:48 COMPOUND NAME T-Butylbenzene ab Sample ID: STD4 480-26294 Date Analyzed: 09/10/15 19:20 COMPOUND NAME ISOpropylbenzene A-Bromofluorobenzene n-Propylbenzene	10.80	Split Peak	larsonj larsonj	09/11/15 08:19	
Date Analyzed: 09/10/15 18:48 COMPOUND NAME n-Butylbenzene Lab Sample ID: STD4 480-26294 Date Analyzed: 09/10/15 19:20 COMPOUND NAME Isopropylbenzene 4-Bromofluorobenzene n-Propylbenzene	IC	Client Sample ID:			
n-Butylbenzene Lab Sample ID: STD4 480-26294 Date Analyzed: 09/10/15 19:20 COMPOUND NAME Isopropylbenzene A-Bromoflucrobenzene		Lab File ID: 3_67063.D	GC Colu	GC Column: RTX-VGC	ID: 0.53(mm)
n-Butylbenzene ab Sample ID: STD4 480-26294 ate Analyzed: 09/10/15 19:20 COMPOUND NAME Isopropylbenzene 4-Bromofluorobenzene	RETENTION	MANUAL IN	INTEGRATION		
n-Butylbenzene ab Sample ID: STD4 480-26294 Date Analyzed: 09/10/15 19:20 COMPOUND NAME Isopropylbenzene 4-Bromofluorobenzene	TIME	REASON	ANALYST	DATE	
ab Sample ID: STD4 480-26294 Date Analyzed: 09/10/15 19:20 COMPOUND NAME Isopropylbenzene 4-Bromofluorobenzene	16.47	Split Peak	larsonj	09/11/15 08:19	
1 100	IC	Client Sample ID:			
COMPOUND NAME Isopropylbenzene 4-Bromofluorobenzene n-Propylbenzene		Lab File ID: 3_67064.D	BC Colu	GC Column: RTX-VGC	ID: 0.53(mm)
Isogropylbenzene 4-Bromofluorobenzene n-Propylbenzene	RETENTION	MANUAL I	MANUAL INTEGRATION		
Isopropylbenzene 4-Bromofluorobenzene n-Propylbenzene	TIME	REASON	ANALYST	DATE	
4-Bromofluorobenzene n-Propylbenzene	69.6	Split Peak	larsonj	09/11/15 08:20	
n-Propylbenzene	10,32	Split Peak	larsonj	09/11/15 08:20	
	10.80	Split Peak	larsonj	09/11/15 08:20	
Lab Sample ID: STD4 480-262944/5	IC	Client Sample ID:			
Date Analyzed: 09/10/15 19:20	0 Lab File	ile ID: 3_67064.D	GC Colu	GC Column: RIX-VGC	ID: 0.53 (mm)
COMPOUND NAME	RETENTION	MANUAL IN	MANUAL INTEGRATION	73446	
o - Distant Managed	16 47	A CONTRACTOR AND A CONT	- Parameter -	09/11/116 08:00	

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GO VOA MANUAL INTEGRATION SUMMARY

		Analysis Batch Mumber: 262944	ple ID:	Cab File ID: 3 67065.D GC Column: RIX-VGC
Job No.:		Analysis 1	c Client Sample ID:	Lab File
Name: TestAmerica Buffalo		HP5890-3	ab Sample ID: STD5 480-262944/6 IC	09/10/15 19:52
Lab Name: TestA	SDG No.:	Instrument ID: HP589	Lab Sample ID:	Date Analyzed: 0

Date Analyzed: 09/10/15 19:52	Lab Fi	Cab File ID: 3 67065.D	GC Colun	GC Column: RIX-VGC	ID: 0.53 (mm)
COMPOUND NAME	RETENTION	MANUAL IN	TEGRATION		
	TIME	REASON	ANALYST	DATE	
Benzene	4.16	Split Peak	Iarsonj	09/11/15 08:21	
n-ButyIbenzene	15.47	7 Split Peak	larabni	09/11/15 08:21	

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GC VOA MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Buffalo	Job No.:	.: 480-89467-1		
SDG No.:				
Instrument ID: HP5890-3	Analys	Analysis Batch Number: 273207		
Lab Sample ID: 480-89467-3	Client	Client Sample ID: WW-01-031915-1550		
Date Analyzed: 11/05/15 12:05	Lab File	le ID: 3_69028.D	GC Column: RIX-VGC	ID: 0.53(mm)
COMPOUND NAME	RETENTION	MANUAL INTEGRATION	EGRATION	
	TIME	REASON	ANALYST DATE	
Benzene	3.50	Split Peak	larsonj 11/06/15 08:44	
Toluene	5.17	Split Peak	larsonj 11/06/15 08:44	
Lab Sample ID: 480-89467-4	Client	Client Sample ID: WW-01-041415-1640		
Date Analyzed: 11/05/15 12:38	Lab Fi	Lab File ID: 3 69029.D	GC Column: RTX-VGC	ID: 0.53 (mm)
COMPOUND NAME	RETENTION	MANUAL INTEGRATION	EGRATION	
	TIME	REASON	ANALYST DATE	
Toluene	5.17	Split Peak	larsonj 11/06/15 08:45	
Lab Sample ID: 480-89467-11	Client	Client Sample ID: P-01-031315-1531		
Date Analyzed: 11/05/15 15:10	Lab Fi	Lab File ID: 3_69033.D	GC Column: RTX-VGC	ID: 0.53 (mm)
COMPOUND NAME	RETENTION	MANUAL INT	INTEGRATION	
	TIME	REASON	ANALYST DATE	
Benzene	3.51	Split Feak	larsonj 11/06/15 08:51	
Lab Sample ID: 480-89467-12	Client	Client Sample ID: P-01-050615-1552		
Date Analyzed: 11/05/15 16:14	Lab Fi	Lab File ID: 3 69035.D	GC Column: REX-VGC	ID: 0.53(mm)
COMPOUND NAME	RETENTION	MANUAL INTEGRATION	EGRATION	
	TIME	REASON	ANALYST DATE	
Benzene	3.51	Split Peak	larsonj 11/06/15 08:52	
Lab Sample ID: 480-89467-21	Client	Client Sample ID: P-01-040115-1600		
Date Analyzed: 11/05/19 16:45	Lab Fi	Lab File ID: 3_69036.D	GC Column: RTX-VGC	ID: 0.53 (mm)
COMPOUND NAME	RETENTION	MANUAL		
	TIME	REASON	ANALYST	
Benzene	3.53	Split Peak	larsonj 11/06/15 08:52	

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SDG No.:				
Instrument ID: HF5890-3	Analys	Analysis Batch Number; 273207		
Lab Sample ID: 480-89467-9	Client	Client Sample ID: WW-01-052015-1500		
Date Analyzed: 11/05/15 18:41	Lab Ei	Lab File ID: 3 69039.D	GC Column: RTX-VGC	ID: 0.53 (mm)
COMPOUND NAME	RETENTION	MANUAL INTEGRATION	EGRATION	Î
Section Section and Asset	TIME	REASON	ANALYST DATE	
Toluene	5.17	Split Peak	larsonj 11/06/15 08:53	53
Lab Sample ID: 480-89467-23	Client	Client Sample ID: P-01-012215-0948		
Date Analyzed: 11/05/15 19:13	Lab Fi	Lab File ID: 3_69040.D	GC Column: RTX-VGC	ID: 0,53(mm)
COMPOUND NAME	RETENTION	MANUAL INTEGRATION	EGRATION	
	TIME	REASON	ANALYST DATE	
4-Bromofluorobenzene	10.32	Split Peak	larsonj 11/06/15 10:54	54
Lab Sample ID: 480-89467-24	Client	Client Sample ID: WW-01-031315-1531		
Date Analyzed: 11/05/15 19:44.	Lab Fi	Lab File ID: 3 69041.D	GC Column: RTX-VGC	ID: 0.53 (mm)
COMPOUND NAME	RETENTION	MANUAL INTEGRATION	EGRATION	Г
	TIME	REASON	ANALYST DATE	
4-Bromofluorobenzene	10,32	10.32 Baseline Smoothing	larsonj 11/06/15 10:54	54

SAMPLE SUMMARY

Job Number: 480-89467-1

Client. U.S. Army Construction Engineering Resea

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
480-89467-1	WW-01-101514-1120	Water	10/15/2014 1120	10/20/2015 0920
480-89467-2	VWV-02-030515-1557	Water	03/05/2015 1557	10/20/2015 0920
480-89467-3	VWV-01-031915-1550	Water	03/19/2015 1550	10/20/2015 0920
480-89467-4	VVV-01-041415-1640	Water	04/14/2015 1640	10/20/2015 0920
480-89467-5	WW-01-030515-1352	Water	03/05/2015 1352	10/20/2015 0920
480-89467-6	WW-01-042815-1600	Water	04/28/2015 1600	10/20/2015 0920
480-89467-7	WW-01-050615-1552	Water	05/06/2015 1552	10/20/2015 0920
480-89467-8	WW-01-050715-1600	Water	05/07/2015 1600	10/20/2015 0920
480-89467-9	WW-01-052015-1500	Water	05/20/2015 1500	10/20/2015 0920
480-89467-10	P+01-030515-1557	Water	03/05/2015 1557	10/20/2015 0920
480-89467-11	P-01-031315-1531	Water	03/13/2015 1531	10/20/2015 0920
480-89467-12	P-01-050615-1552	Water	05/06/2015 1552	10/20/2015 0920
480-89467-13	P-01-051315-1530	Water	05/13/2015 1530	10/20/2015 0920
480-89467-14	OS-01-031815-1530	Waste	03/18/2015 1530	10/20/2015 0920
480-89467-15	OS-01-042415-1600	Waste	04/24/2015 1600	10/20/2015 0920
480-89467-16	OS-01-042815-1600	Waste	04/28/2015 1600	10/20/2015 0920
480-89467-17	OS-01-050715-1630	Waste	05/07/2015 1630	10/20/2015 0920
480-89467-18	P-01-101514-0910	Water	10/15/2014 0910	10/20/2015 0920
480-89467-19	P-01-100814-1120	Water	10/08/2014 1120	10/20/2015 0920
480-89467-20	P-01-013015-0915	Water	01/30/2015 0915	10/20/2015 0920
480-89467-21	P-01-040115-1600	Water	04/01/2015 1600	10/20/2015 0920
480-89467-22	OS-01-101514-0910	Waste	10/15/2014 0910	10/20/2015 0920
480-89467-23	P-01-012215-0948	Water	01/22/2015 0948	10/20/2015 0920
480-89467-24	VWV-01-031315-1531	Water	03/13/2015 1531	10/20/2015 0920

Job Number 480-89467-1

Client: U.S. Army Construction Engineering Resea

Lab Sample ID Analyte	Client Sample ID	Result	Qualifier	Reporting Limit	Units	Method
480-89467-1	WW-01-101514-1120					
Benzene	100.21 1932113142	320	H	40	ug/L	8021B
Toluene		11	9.H	40	ug/L	8021B
480-89467-2	WW-02-030515-1557					
Naphthalene		34	314	97	ug/L	8270D
480-89467-3	WW-01-031915-1550					
Benzene		1500	Н	160	ug/L	8021B
Toluene		240	Н	160	ug/L	8021B
m, p-Xylene		75	1H	320	ug/L	8021B
Xylenes, Total		75	JH	480	ug/L	8021B
480-89467-4	WW-01-041415-1640					
Benzene		1800	H	40	ug/L	8021B
Toluene		890	H	40	ug/L	8021B
Ethylbenzene		450	H	40	ug/L	8021B
m,p-Xylene		300	H	80	ug/L	8021B
Xylenes, Total		300	н	120	ug/L	8021B
480-89467-5	WW-01-030515-1352					
Naphthalene		15	JH	97	ug/L	8270D
480-89467-6	WW-01-042815-1600					
Acenaphthene		30	3.8	96	ug/L	8270D
Acenaphthylene		130	Н	96	ug/L	8270D
Anthracene		7.4	J.A.	96	ug/L	8270D
Fluorene		26	JH	96	ug/L	8270D
Naphthalene		1700	H	480	ug/L	8270D
Phenanthrene		24	JH	96	ug/L	8270D
480-89467-7	WW-01-050615-1552					
Benzene	200	1900	н	40	ug/L	8021B
Toluene		1400	н	40	ug/L	8021B
Ethylbenzene		890	Н	40	ug/L	8021B
m,p-Xylene		2200	Н	80	ug/L	8021B
Xylenes, Total		2200	Н	120	ug/L	8021B

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Job Number 480-89467-1

Client: U.S. Army Construction Engineering Resea

Lab Sample ID Analyte	Client Sample ID	Result	Qualifier	Reporting Limit	Units	Method
480-89467-8	WW-01-050715-1600	-				91.77
Acenaphthene	4447.44 5.25 5.45 5.45 5.45	64	JH	96	ug/L	8270D
Acenaphthylene		210	H	96	ug/L	8270D
Anthracene		15	JH	96	ug/L	8270D
Fluorene		48	JH	96	ug/L	8270D
Naphthalene		1800	H	480	ug/L	8270D
Phenanthrene		51	9.4	96	ug/L	8270D
480-89467-9	WW-01-052015-1500					
Benzene		670	Н	40	ug/L	8021B
Toluene		87	H	40	ug/L	8021B
m,p-Xylene		55	JH	80	ug/L	8021B
o-Xylene		160	H	40	ug/L	8021B
Xylenes, Total		220	н	120	ug/L	8021B
480-89467-10	P-01-030515-1557					
Naphthalene	X 44.46.35.44.6	160	н	97	ug/L	8270D
480-89467-11	P-01-031315-1531					
Benzene	S. S. Stoke Stoke	2400	н	400	ug/L	8021B
Toluene		260	JH	400	ug/L	8021B
m.p-Xylene		110	JH	800	ug/L	8021B
Xylenes, Total		110	14	1200	ug/L	8021B
480-89467-12	P-01-050615-1552					
Benzene	- 1. 40 ACTUAL 1440	1400	H	80	ug/L	8021B
Toluene		120	H	80	ug/L	8021B
m,p-Xylene		50	JH	160	ug/L	8021B
Xylenes, Total		50	ДH	240	ug/L	8021B
480-89467-13	P-01-051315-1530					
Naphthalene	-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1	28	JH	100	ug/L	8270D

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Job Number 480-89467-1

Client: U.S. Army Construction Engineering Resea

Lab Sample ID Analyte	Client Sample ID	Result	Qualifier	Reporting Limit	Units	Method
480-89467-14	OS-01-031815-1530	Arrest T				01.7
Acenaphthene		430000	Н	260000	ug/Kg	8270D
Acenaphthylene		930000	H	260000	ug/Kg	8270D
luoranthene		400000	H	260000	ug/Kg	8270D
luorene		770000	H	260000	ug/Kg	8270D
laphthalene		2300000	H	260000	ug/Kg	8270D
henanthrene		270000	H	260000	ug/Kg	8270D
Pyrene		560000	Н	260000	ug/Kg	8270D
180-89467-15	OS-01-042415-1600					
Acenaphthene		390000	H	31000	ug/Kg	8270D
cenaphthylene		1400000	H	31000	ug/Kg	8270D
Anthracene		230000	н	31000	ug/Kg	8270D
Benzo[a]anthracene		150000	H	31000	ug/Kg	8270D
Benzo[a]pyrene		96000	Н	31000	ug/Kg	8270D
Benzo[b]fluoranthen	ė	34000	Н	31000	ug/Kg	8270D
Benzo[g,h,i]perylene		62000	н	31000	ug/Kg	8270D
Benzo[k]fluoranthen		82000	H	31000	ug/Kg	8270D
hrysene	ō,1	140000	H	31000	ug/Kg	8270D
luoranthene		410000	Н	31000	ug/Kg	8270D
luorene		590000	Н	31000	ug/Kg	8270D
ndeno[1,2,3-cd]pyre	ene	42000	H	31000	ug/Kg	8270D
laphthalene		3600000	H	31000	ug/Kg	8270D
henanthrene		1200000	H	31000	ug/Kg	8270D
Pyrene		580000	Н	31000	ug/Kg	8270D
480-89467-16	OS-01-042815-1600					
Acenaphthene		220000	JH	570000	ug/Kg	8270D
Acenaphthylene		610000	H	570000	ug/Kg	8270D
luoranthene		270000	JH	570000	ug/Kg	8270D
luorene		420000	JH	570000	ug/Kg	8270D
laphthalene		1100000	H	570000	ug/Kg	8270D
yrene		450000	JH	570000	ug/Kg	8270D
180-89467-17	OS-01-050715-1630					
Acenaphthylene		980000	н	280000	ug/Kg	8270D
Benzo[a]pyrene		120000	JH	280000	ug/Kg	8270D
Chrysene		170000	JH	280000	ug/Kg	8270D
luoranthene		610000	Н	280000	ug/Kg	8270D
luorene		590000	H	280000	ug/Kg	8270D
Vaphthalene		1200000	Н	280000	ug/Kg	8270D
Phenanthrene		410000	Н	280000	ug/Kg	8270D
Pyrene		750000	н	280000	ug/Kg	8270D

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Job Number 480-89467-1

Client: U.S. Army Construction Engineering Resea

Lab Sample ID Analyte	Client Sample ID	Result	Qualifier	Reporting Limit	Units	Method
480-89467-18	P-01-101514-0910					
Naphthalene		20	JH	94	ug/L	8270D
480-89467-19	P-01-100814-1120					
Naphthalene		18	1H	97	ug/L	8270D
480-89467-20	P-01-013015-0915					
Acenaphthene		17	UH	98	ug/L	8270D
Acenaphthylene		140	H	98	ug/L	8270D
Anthracene		11	JH	98	ug/L	8270D
Fluoranthene		9.7	JH	98	ug/L	8270D
Fluorene		26	JH	98	ug/L	8270D
Naphthalene		1600	H	490	ug/L	8270D
Phenanthrene		33	JH	98	ug/L	8270D
480-89467-21	P-01-040115-1600					
Benzene	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	14000	Н	160	ug/L	8021B
Toluene		5500	Н	160	ug/L	8021B
Ethylbenzene		3700	H	160	ug/L	8021B
m,p-Xylene		7700	H	320	ug/L	8021B
Xylenes, Total		7700	Н	480	ug/L	8021B
480-89467-22	OS-01-101514-0910					
Acenaphthylene	32303418313334	470000	Н	260000	ug/Kg	8270D
Fluoranthene		190000	JH	260000	ug/Kg	8270D
Fluorene		300000	н	260000	ug/Kg	8270D
Naphthalene		1200000	H	260000	ug/Kg	8270D
Pyrene		200000	JH	260000	ug/Kg	8270D
480-89467-23	P-01-012215-0948					
Benzene	V-01-01FE10-0940	160	н	3.6	ug/L	8021B
Toluene		7.9	н	3.6	ug/L	8021B
m,p-Xylene		6.8	JH	7.3	ug/L	8021B
Xylenes, Total		68	ЛH	11	ug/L	8021B
480-89467-24	WW-01-031315-1531					
Benzene	WW-01-031313-1331	12	н	0.91	ug/L	8021B
Toluene		14	H	0.91	ug/L	8021B
o-Xylene		3.7	Н	0.91	ug/L	8021B
Xylenes, Total		3.7	H	2.7	ug/L	8021B
Aylenes, Total		32. (21	ug/L	OUZID

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METHOD SUMMARY

Client, U.S. Army Construction Engineering Resea

Job Number: 480-89467-1

Description	Lab Location	Method	Preparation Method
Matrix:			
Matrix; Waste			
Semivolatile Organic Compounds (GC/MS) Waste Dilution	TAL BUF	SW846 8270D	SW846 3580A
Matrix: Water			
Semivolatile Organic Compounds (GC/MS) Liquid-Liquid Extraction (Separatory Funnel)	TAL BUF	SW846 8270D	SW846 3510C
Volatile Organic Compounds (GC) Purge and Trap	TAL BUF	SW846 8021B	SW846 5030B

Lab References:

TAL BUF = TestAmerica Buffalo

Method References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates,

METHOD / ANALYST SUMMARY

Client: U.S. Army Construction Engineering Resea

Job Number 480-89467-1

Method	Analyst	Analyst ID
SW846 8270D SW846 8270D	Richards, Devon M Sosinski, Courtney A	DMR CAS
SW846 8021B	Larson, Joseph R	JRL

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Client: U.S. Army Construction Engineering Resea

Job Number: 480-89467-1

Client Sample ID: WW-02-030515-1557

Lab Sample ID: Client Matrix: 480-89467-2

Water

Date Sampled: 03/05/2015 1557 Date Received: 10/20/2015 0920

	82	70D Semivolatile Org	anic Compou	nds (G	C/MS)	
Analysis Method Prep Method Dilution: Analysis Date Prep Date:	8270D 3510C 20 11/10/2015 1723 11/06/2015 1233	Analysis Batch: Prep Batch:	480-273999 480-273586		Instrument ID: Lab File ID: Initial Weight/Volume: Final Weight/Volume: Injection Volume:	HP5973V V60015.D 258 mL 1 mL 2 uL
Analyte		Result (u	g/L) C	Qualifie	r MDL	RL
Acenaphthene		ND	+	1	7.9	97
Acenaphthylene		ND	+	+	7.4	97
Anthracene		ND	- (+	5,4	97
Benzo[a]anthrace	ne	ND	1	4	7.0	97
Benzo[a]pyrene		ND	H		9.1	97
Benzo[b]fluoranth	ene	ND	+	4	6.6	97
Benzo[g,h,i]peryle	ne	ND	+	4	6,8	97
Benzo[k]fluoranthe	ene	ND	t	+	14	97
Chrysene		ND	+	4	6.4	97
Dibenz(a,h)anthra	icene	ND	· · ·		8.1	97
Fluoranthene		ND)÷		7.8	97
Fluorene		ND	6		7.0	97
Indeno[1,2,3-cd]p	yrene	ND	+	1	9.1	97
Naphthalene		34	-Ú	H	15	97
Phenanthrene		ND	+		8.5	97
Pyrene		ND	· ·	4	6.6	.97
Surrogate		%Rec		Qualifie	r Acceptai	nce Limits
2-Fluorobiphenyl		101			48 - 120	
Nitrobenzene-d5 ((Surr)	152	>	¢	46 - 120	
p-Terphenyl-d14 (Surr)	76			67 - 150	

Client: U.S. Army Construction Engineering Resea

Job Number: 480-89467-1

Client Sample ID: WW-01-030515-1352

Lab Sample ID:

480-89467-5

Client Matrix: Water

Date Sampled: 03/05/2015 1352 Date Received: 10/20/2015 0920

Analysis Method:	8270D	Analysis Batch:	480-273999	Instrument ID:	HP5973V
Prep Method	3510C	Prep Batch:	480-273586	Lab File ID:	V60016.D
Dilution:	20			Initial Weight/Volume:	258.9 mL

8270D Semivolatile Organic Compounds (GC/MS)

Analysis Date: 11/10/2015 1752 Prep Date: 11/06/2015 1233 Final Weight/Volume: 1 mL Injection Volume: 2 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Acenaphthene	ND	H	7.9	97
Acenaphthylene	ND	H	73	97
Anthracene	ND	H	5.4	97
Benzo[a]anthracene	ND	H	7.0	97
Benzo[a]pyrene	ND	H	9.1	97
Benzo[b]fluoranthene	ND	H	6.6	97
Benzo[g,h,i]perylene	ND	H	6.8	97
Benzo[k]fluoranthene	ND	H	14	97
Chrysene	ND	H	6.4	97
Dibenz(a,h)anthracene	ND	H	8.1	97
Fluoranthene	ND	H	7.7	97
Fluorene	ND	H	7.0	97
ndeno[1,2,3-cd]pyrene	ND	H	9.1	97
Vaphthalene	15	JH	15	97
Phenanthrene	ND	H	8.5	97
Pyrene	ND	H	6.6	.97
Surrogate	%Rec	Qualifier	Accepta	ance Limits
2-Fluorobiphenyl	91		48 - 12	0
Nitrobenzene-d5 (Surr)	76		46 - 12	0
p-Terphenyl-d14 (Surr)	73		67 - 15	0

Client: U.S. Army Construction Engineering Resea

Job Number: 480-89467-1

Client Sample ID:

WW-01-042815-1600

Lab Sample ID: Client Matrix: 480-89467-6

Water

Date Sampled: 04/28/2015 1600 Date Received: 10/20/2015 0920

	82	70D Semivolatile Org	anic Compound	s (GC/MS)	
Analysis Method	8270D	Analysis Batch	480-273999	Instrument ID:	HP5973V
Prep Method	3510C	Prep Batch:	480-273586	Lab File ID:	V60017.D
Dilution:	20	0.00		Initial Weight/Volume:	259.7 mL
Analysis Date:	11/10/2015 1921			Final \Maight/\Values	1 ml

Analysis Date: 11/10/2015 1821 Prep Date: 11/06/2015 1233 Final Weight/Volume: 1 mL Injection Volume: 2 uL

Prep Date: 11/06/2015 1233		Injec	Injection Volume: 2 uL		
Analyte	Result (ug/L)	Qualifier	MDL	RL	
Acenaphthene	30	JH	7.9	96	
Acenaphthylene	130	H	73	96	
Anthracene	7.4	JH	5,4	96	
Benzo[a]anthracene	ND	H	6.9	96	
Benzo[a]pyrene	ND	H	9,0	96	
Benzo[b]fluoranthene	ND	H	6.5	96	
Benzo[g,h,i]perylene	ND	H	6.7	96	
Benzo[k]fluoranthene	ND	H	14	96	
Chrysene	ND	H	6.4	96	
Dibenz(a,h)anthracene	ND	H	8.1	96	
Fluoranthene	ND	H	7.7	96	
Fluorene	26	JH	6.9	96	
Indeno[1,2,3-cd]pyrene	ND	H	9.0	96	
Naphthalene	1500	EH	15	96	
Phenanthrene	24	JH	8.5	96	
Pyrene	ND	H	6.5	96	
Surrogate	%Rec	Qualifier	Accep	tance Limits	
2-Fluorobiphenyl	106		48 - 12	20	
Nitrobenzene-d5 (Surr)	106		46 - 13	20	
p-Terphenyl-d14 (Surr)	85		67 - 15	50	

Client: U.S. Army Construction Engineering Resea

Job Number: 480-89467-1

Client Sample ID:

WW-01-042815-1600

Lab Sample ID: Client Matrix:

480-89467-6

Water

Date Sampled: 04/28/2015 1600

Date	Received	10/20/2015 0920
Date	TOGODIYOU.	10/20/20 10 0020

	82	70D Semivolatile Org	anic Compoun	ds (GC/MS)	
Analysis Method Prep Method Dilution:	8270D 3510C 100	Analysis Batch: Prep Batch:	480-274392 480-273586	Instrument ID: Lab File ID: Initial Weight/Volum	HP5973V V60046.D me: 259.7 mL
Analysis Date:	11/11/2015 1347	Run Type:	DL	Final Weight/Volum	
Prep Date:	11/06/2015 1233			Injection Volume:	2 uL
Analyte		Result (u	g/L) Qi	ualifier MDL	RL
Acenaphthene		41	41	H 39	480
Acenaphthylene		140	J	H 37	480
Anthracene		ND	H	27	480
Benzo[a]anthrace	ne	ND	H	35	480
Benzo[a]pyrene		ND	H	45	480
Benzo[b]fluoranth	ene	ND	H	33	480
Benzo[g,h,i]peryle	ne	ND	H	34	480
Benzo[k]fluoranthe	ene	ND	H	70	480
Chrysene		ND	H	32	480
Dibenz(a,h)anthra	cene	ND	H	40	480
Fluoranthene		ND	H	39	480
Fluorene		ND	H	35	480
Indeno[1,2,3-cd]p	yrene	ND	H	45	480
Naphthalene		1700	H	73	480
Phenanthrene		ND	H	42	480
Pyrene		ND	H	33	480
Surrogate		%Rec	Q	ualifier Acce	ptance Limits
2-Fluorobiphenyl		99		48 - 1	120
Nitrobenzene-d5 (Surr)	0	×	46 - 1	120
p-Terphenyl-d14 (Surr)	104		67 - 1	150

Client: U.S. Army Construction Engineering Resea

Job Number: 480-89467-1

Client Sample ID: WW-01-050715-1600

Lab Sample ID: Client Matrix:

480-89467-8

Water

Date Sampled: 05/07/2015 1600 Date Received: 10/20/2015 0920

	02	70D Semivolatile Org	anic compot	mas (c	Christ	
Analysis Method Prep Method Dilution: Analysis Date:	8270D 3510C 20 11/10/2015 1850	Analysis Batch: Prep Batch:	480-273999 480-273586		Instrument ID: Lab File ID: Initial Weight/Volume: Final Weight/Volume:	HP5973V V60018.D 259.1 mL 1 mL
Prep Date:	11/06/2015 1233				Injection Volume:	2 uL
Analyte		Result (u	g/L)	Qualifie	r MDL	RL
Acenaphthene		64		JH:	7.9	96
Acenaphthylene		210		Н	7.3	96
Anthracene		15		JH	5,4	96
Benzo[a]anthrace	ne	ND		Н	6.9	96
Benzo[a]pyrene		ND		H	9.1	96
Benzo[b]fluoranth	ene	ND		H	6.6	96
Benzo[g,h,i]peryle		ND		н	6.8	96
Benzo[k]fluoranthe		ND		H	14	96
Chrysene		ND		H	6.4	96
Dibenz(a,h)anthra	cene	ND		Н	8.1	96
Fluoranthene		ND		H	7.7	96
Fluorene		48		HL	6,9	96
Indeno[1,2,3-cd]p	yrene	ND		H	9.1	96
Naphthalene		1700		EH	15	96
Phenanthrene		51		JH	8.5	96
Pyrene		ND	- 0	Н	6.6	96
Surrogate		%Rec		Qualifie	r Acceptai	nce Limits
2-Fluorobiphenyl		98		-	48 - 120	
Nitrobenzene-d5 (Surr)	0	- 3	X	46 - 120	
p-Terphenyl-d14 (Surr)	72			67 - 150	

Client: U.S. Army Construction Engineering Resea

Job Number: 480-89467-1

Client Sample ID: WW-01-050715-1600

Lab Sample ID: Client Matrix:

480-89467-8

ix: Water

Date Sampled: 05/07/2015 1600

Date Received: 10/20/2015 0920

	82	70D Semivolatile Org	anic Compo	unds (G	C/MS)	
Analysis Method Prep Method Dilution:	8270D 3510C 100	Analysis Batch: Prep Batch:	480-274392 480-273586		Instrument ID: Lab File ID: Initial Weight/Volume:	HP5973V V60047 D 259.1 mL
Analysis Date	11/11/2015 1416	Run Type:	DL		Final Weight/Volume:	1 mL
Prep Date:	11/06/2015 1233				Injection Volume:	2 uL
Analyte		Result (u	g/L)	Qualifie	r MDL	RL
Acenaphthene		52		JH	40	480
Acenaphthylene		210		JH	37	480
Anthracene		ND		H	27	480
Benzo[a]anthrace	ne	ND		H	35	480
Benzo[a]pyrene		ND		H	45	480
Benzo[b]fluoranth	ene	ND		H	33	480
Benzo[g,h,i]peryle	ne	ND		H	34	480
Benzo[k]fluoranthe	ene	ND		H	70	480
Chrysene		ND		H	32	480
Dibenz(a,h)anthra	cene	ND		H	41	480
Fluoranthene		ND		H	39	480
Fluorene		47		JH	35	480
Indeno[1,2,3-cd]p	vrene	ND		H	45	480
Naphthalene		1800		н	73	480
Phenanthrene		49		JH	42	480
Pyrene		ND		Н	33	480
Surrogate		%Rec		Qualifie	r Accepta	nce Limits
2-Fluorobiphenyl		87			48 - 120	
Nitrobenzene-d5 (Surr)	0		×	46 - 120	
p-Terphenyl-d14 (Surr)	76			67 - 150	6

Client: U.S. Army Construction Engineering Resea

Job Number: 480-89467-1

Client Sample ID: P-01-030515-1557

Lab Sample ID:

480-89467-10

Client Matrix:

Water

Date Sampled: 03/05/2015 1557 Date Received: 10/20/2015 0920

		70D Semivolatile Org	Target and the same		-31	
Analysis Method.	8270D	Analysis Batch:	480-273999		nstrument ID:	HP5973V
Prep Method	3510C	Prep Batch.	480-273586		ab File ID:	V60019.D
Dilution:	20			1	nitial Weight/Volume:	257.5 ml
Analysis Date:	11/10/2015 1919			F	inal Weight/Volume:	1 mL
Prep Date:	11/06/2015 1233			1	njection Volume:	2 uL
Analyte.		Result (u	ig/L) Q	ualifier	MDL	RL
Acenaphthene		ND	H		8.0	97
Acenaphthylene		ND	н		7.4	97
Anthracene		ND	θ.		5,4	97
Benzo[a]anthrace	ne	ND	H		7.0	97
Benzo[a]pyrene		ND	H		9.1	97
Benzo[b]fluoranth	ene	ND	H		6.6	97
Benzo[g,h,i]peryle	ne	ND	H		6.8	97
Benzo[k]fluoranthe	ene	ND	Н		14	97
Chrysene		ND	H		6.4	97
Dibenz(a,h)anthra	cene	ND	H		8.2	97
Fluoranthene		ND	H		7.8	97
Fluorene		ND	H		7.0	97
Indeno[1,2,3-cd]p	yrene	ND	Н		9.1	97
Naphthalene		160	H		15	97
Phenanthrene		ND	H		8.5	97
Pyrene		ND	H		6.6	.97
Surrogate		%Rec	0	ualifier	Acceptar	nce Limits
2-Fluorobiphenyl		81			48 - 120	
Nitrobenzene-d5 (Surr)	0	×		46 - 120	
p-Terphenyl-d14 (Surr)	67			67 - 150	

Client: U.S. Army Construction Engineering Resea

Job Number: 480-89467-1

Client Sample ID:

P-01-051315-1530

Lab Sample ID:

480-89467-13

Client Matrix: Water

Nitrobenzene-d5 (Surr) p-Terphenyl-d14 (Surr)

Date Sampled: 05/13/2015 1530 Date Received: 10/20/2015 0920

46 - 120 67 - 150

	82	70D Semivolatile Org	ganic Compo	unds (G	C/MS)	
Analysis Method: Prep Method Dilution: Analysis Date: Prep Date:	8270D 3510C 20 11/10/2015 1948 11/06/2015 1233	Analysis Batch: Prep Batch:	480-273999 480-273586		Instrument ID: Lab File ID: Initial Weight/Volume: Final Weight/Volume: Injection Volume:	HP5973V V60020.D 242.4 mL 1 mL 2 uL
Analyte		Result (ig/L)	Qualifie	r MDL	RL
Acenaphthene		ND		H	8.5	100
Acenaphthylene		ND		H	7.8	100
Anthracene		ND		H	5,8	100
Benzo[a]anthrace	ne	ND		H	7.4	100
Benzo[a]pyrene		ND		H	9.7	100
Benzo[b]fluoranth	ene	ND		H	7.0	100
Benzo[g,h,i]peryle	ene	ND		H	7.2	100
Benzo[k]fluoranthe		ND		H	15	100
Chrysene		ND		H	6.8	100
Dibenz(a,h)anthra	icene	ND		H	8.7	100
luoranthene		ND		H	8,3	100
luorene		ND		H	7.4	100
ndeno[1,2,3-cd]p	yrene	ND		H	9.7	100
Vaphthalene		28		JH	16	100
henanthrene		ND		H	9.1	100
Pyrene		ND		H	7.0	100
Surrogate		%Rec		Qualifie	1,00000	nce Limits
2-Fluorobiphenyl		95			48 - 120	
Hardwann de /	(Carlon)			No.	46 466	

X

0

83

Client: U.S. Army Construction Engineering Resea

Job Number: 480-89467-1

Client Sample ID: OS-01-031815-1530

Lab Sample ID: Client Matrix:

480-89467-14

Waste

Date Sampled: 03/18/2015 1530 Date Received: 10/20/2015 0920

Date Received	d: 10/20/2015 0920
	and the second second

	8270	D Semivolatile Org	anic Compounds	(GC/MS)		
Analysis Method: Prep Method Dilution: Analysis Date: Prep Date;	8270D 3580A 100 11/05/2015 1634 11/04/2015 1345	Analysis Batch; Prep Batch.	480-273506 480-273073	Instrument ID: Lab File ID: Initial Weight/Volume: Final Weight/Volume: Injection Volume:		
Analyte	DryWt Corrected	t: N Result (u	g/Kg) Qua	ifier MDL	RL	
Acenaphthene		430000	H	3100	260000	
Acenaphthylene		930000	н	2200	260000	
Anthracene		ND	H	6600	260000	
Benzo[a]anthrace	ne	ND	H	4500	260000	
Benzo[a]pyrene		ND	H	6300	260000	
Benzo[b]fluoranth	ene	ND	H	5100	260000	
Benzo[g,h,i]peryle	ne	ND	H	3100	260000	
Benzo[k]fluoranthe	ene	ND	H	2900	260000	
Chrysene		ND	H	2600	260000	
Dibenz(a,h)anthra	cene	ND	H	3100	260000	
Fluoranthene		400000	H	3700	260000	
Fluorene		770000	H	6000	260000	
Indeno[1,2,3-cd]p	/rene	ND	H	7200	260000	
Naphthalene		2300000	Н	4300	260000	
Phenanthrene		270000	H	5400	260000	
Pyrene		560000	Н	1700	260000	
Surrogate		%Rec	Qua	ifier Accepta	nce Limits	
2-Fluorobiphenyl		94		37 - 120		
Nitrobenzene-d5 (Surr)	65		34 - 132		
p-Terphenyl-d14 (Surr)	94			65 - 153	

Client: U.S. Army Construction Engineering Resea

Job Number: 480-89467-1

Client Sample ID:

OS-01-042415-1600

Lab Sample ID:

480-89467-15

Client Matrix: Waste

Date Sampled: 04/24/2015 1600 Date Received: 10/20/2015 0920

8270D	Samiunlatila	Organic C	'omnounds	(COME)	

Analysis Method.	8270D	Analysis Batch:	480-273506	Instrument ID:	HP5973X
Prep Method	3580A	Prep Batch:	480-273073	Lab File ID:	X009014109.D
Dilution:	10			Initial Weight/Volume:	+0.11 g
Analysis Date:	11/05/2015 1701			Final Weight/Volume:	1 mL
Pren Date:	11/04/2015 1345			Injection Volume:	1 0

Result (ug/Kg)	Qualifier	MDL	RL
390000	H	360	31000
1400000	H	250	31000
230000	H	780	31000
150000	H	530	31000
96000	H	750	31000
34000	Н	600	31000
62000	H	360	31000
82000	H	350	31000
140000	H	310	31000
ND	H	360	31000
410000	H	440	31000
590000	H	710	31000
42000	Н	850	31000
3600000	H	510	31000
1200000	H	640	31000
580000	H	200	31000
%Rec	Qualifier	Accept	ance Limits
102		37 - 12	20
88		34 - 13	12
101		65 - 15	3
	1400000 230000 150000 96000 34000 62000 82000 140000 ND 410000 590000 42000 3600000 1200000 580000	390000 H 1400000 H 230000 H 150000 H 96000 H 34000 H 82000 H 82000 H 140000 H ND H 410000 H 590000 H 3600000 H 3600000 H 3600000 H 780000 H	390000 H 360 1400000 H 250 230000 H 780 150000 H 530 96000 H 750 34000 H 600 62000 H 360 82000 H 350 140000 H 310 ND H 360 410000 H 310 ND H 360 410000 H 440 590000 H 710 42000 H 850 3600000 H 510 1200000 H 640 580000 H 200 %Rec Qualifier Accept

Client: U.S. Army Construction Engineering Resea

Job Number: 480-89467-1

Client Sample ID:

OS-01-042815-1600

Lab Sample ID:

480-89467-16

Client Matrix: Waste

Date Sampled: 04/28/2015 1600 Date Received: 10/20/2015 0920

		8270D Semivolatile Organic Compounds (GC/MS)					
Land.	9270D	Analysis Dateb	400 070500	Yeath was at ID:			

Analysis Method: 8270D HP5973X Instrument ID: Prep Method X009014110.D 3580A Prep Batch: 480-273073 Lab File ID: Dilution: 200 Initial Weight/Volume: +0.12 g Analysis Date: 11/05/2015 1728 Final Weight/Volume: 1 mL Prep Date: 11/04/2015 1345 Injection Volume: 1 uL

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	MDL	RL
Acenaphthene		220000	JH	6700	570000
Acenaphthylene		610000	H	4700	570000
Anthracene		ND	H	14000	570000
Benzo[a]anthracene		ND	H	9700	570000
Benzo[a]pyrene		ND	H	14000	570000
Benzo[b]fluoranthene		ND	H	11000	570000
Benzo[g,h,i]perylene		ND	H	6700	570000
Benzo[k]fluoranthene		ND	H	6300	570000
Chrysene		ND	H	5700	570000
Dibenz(a,h)anthracene		ND	H	6700	570000
Fluoranthene		270000	JH	8000	570000
Fluorene		420000	JH	13000	570000
Indeno[1,2,3-cd]pyrene		ND	H	16000	570000
Naphthalene		1100000	H	9300	570000
Phenanthrene		ND	H	12000	570000
Pyrene		450000	JH	3700	570000
Surrogate		%Rec	Qualifier	Acceptano	e Limits
2-Fluorobiphenyl		83		37 - 120	-
Nitrobenzene-d5 (Surr)		0	×	34 - 132	
p-Terphenyl-d14 (Surr)		81		65 - 153	

Client: U.S. Army Construction Engineering Resea

Job Number: 480-89467-1

Client Sample ID:

OS-01-050715-1630

Lab Sample ID:

480-89467-17

Client Matrix:

Waste

Date Sampled: 05/07/2015 1630 Date Received: 10/20/2015 0920

Analysis Method:	8270D	Analysis Batch:	480-273506	Instrument ID:	HP5973X
Prep Method	3580A	Prep Batch:	480-273073	Lab File ID:	X009014111.D
Dilution:	100			Initial Weight/Volume:	+0.12 g

8270D Semivolatile Organic Compounds (GC/MS)

Analysis Date: 11/05/2015 1755 Prep Date: 11/04/2015 1345 Final Weight/Volume: +0.12 g
Final Weight/Volume: 1 mL
Injection Volume: 1 uL

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	MDL	RL
Acenaphthene	12.001000110010010	ND	Н	3300	280000
Acenaphthylene		980000	H	2300	280000
Anthracene		ND	H	7200	280000
Benzo[a]anthracene		ND	H	4800	280000
Benzo[a]pyrene		120000	JH	6800	280000
Benzo[b]fluoranthene		ND	H	5500	280000
Benzolg,h,ilperylene		ND	H	3300	280000
Benzo[k]fluoranthene		ND	H	3200	280000
Chrysene		170000	JH	2800	280000
Dibenz(a,h)anthracene		ND	Н	3300	280000
Fluoranthene		610000	H	4000	280000
Fluorene		590000	H	6500	280000
Indeno[1,2,3-cd]pyrene		ND	H	7800	280000
Naphthalene		1200000	H	4700	280000
Phenanthrene		410000	H	5800	280000
Pyrene		750000	H	1800	280000
Surrogate		%Rec	Qualifier	Accept	ance Limits
2-Fluorobiphenyl		97		37 - 12	0
Nitrobenzene-d5 (Surr)		94		34 - 13	2
p-Terphenyl-d14 (Surr)		103		65 - 15	3

Client: U.S. Army Construction Engineering Resea

Job Number: 480-89467-1

Client Sample ID:

P-01-101514-0910

Lab Sample ID:

480-89467-18

Client Matrix: Water Date Sampled: 10/15/2014 0910 Date Received: 10/20/2015 0920

	82	70D Semivolatile Org	anic Compoun	ds (GC/MS)	
Analysis Method Prep Method Dilution: Analysis Date Prep Date:	8270D 3510C 20 11/10/2015 2017 11/06/2015 1233	Analysis Batch: Prep Batch:	480-273999 480-273586	Instrument ID: Lab File ID: Initial Weight/Vol Final Weight/Volume	ume: 1 mL
Analyte		Result (u	g/L) Qi	ualifier MDL	RL
Acenaphthene		ND	H	7.7	94
Acenaphthylene		ND	H	7.1	94
Anthracene		ND	H	5.2	94
Benzo[a]anthrace	ne	ND	H	6.7	94
Benzo[a]pyrene		ND	H	8.8	94
Benzo[b]fluoranth	ene	ND	H	6.4	94
Benzo[g,h,i]peryle	ne	ND	H	6,6	94
Benzo[k]fluoranthe	ene	ND	H	14	94
Chrysene		ND	H	6.2	94
Dibenz(a,h)anthra	cene	ND	H	7,9	94
Fluoranthene		ND	H	7.5	94
Fluorene		ND	H	6.7	94
Indeno[1,2,3-cd]p:	yrene	ND	H	8.8	94
Naphthalene		20	.03		94
Phenanthrene		ND	H	8.2	94
Pyrene		ND	H	6.4	94
Surrogate		%Rec	Q	ualifier Acc	ceptance Limits
2-Fluorobiphenyl		93		48	120
Nitrobenzene-d5 (Surr)	0	×	46	- 120
p-Terphenyl-d14 (Surr)	74		67	- 150

Client: U.S. Army Construction Engineering Resea

Job Number: 480-89467-1

Client Sample ID: P-01-100814-1120

Lab Sample ID:

480-89467-19

Client Matrix:

Water

Date Sampled: 10/08/2014 1120 Date Received: 10/20/2015 0920

PATE 11 CHARLES					The second second
	82	70D Semivolatile Org	janic Compour	nds (GC/MS)	
Analysis Method. Prep Method Dilution: Analysis Date: Prep Date:	8270D 3510C 20 11/10/2015 2046 11/06/2015 1233	Analysis Batch: Prep Batch:	480-273999 480-273586	Instrument IE Lab File ID: Initial Weight Final Weight Injection Vol	V60022.D /Volume: 257.5 mL /Volume: 1 mL
Analyte		Result (u	ig/L) Q	ualifier MD	L RL
Acenaphthene		ND	H	8.0	97
Acenaphthylene		ND	н	7.4	97
Anthracene		ND	θ	5,4	97
Benzo[a]anthrace	ne	ND	H	7.0	97
Benzo[a]pyrene		ND	H	9.1	97
Benzo[b]fluoranth	ene	ND	H	6.6	97
Benzo[g,h,i]peryle	ne	ND	H	6,8	97
Benzo[k]fluoranthe	ene	ND	H	14	97
Chrysene		ND	H	6.4	97
Dibenz(a,h)anthra	icene	ND	H	8,2	97
Fluoranthene		ND	H	7.8	97
Fluorene		ND	H	7.0	97
Indeno[1,2,3-cd]p	yrene	ND	H	9.1	97
Naphthalene		18	.):		97
Phenanthrene		ND	H	8.5	97
Pyrene		ND	H	66	.97
Surrogate		%Rec	٥	ualifier	Acceptance Limits
2-Fluorobiphenyl		94			48 - 120
Nitrobenzene-d5 (Surr)	.0	×		46 - 120
p-Terphenyl-d14 (Surr)	98			67 - 150

Client: U.S. Army Construction Engineering Resea

Job Number: 480-89467-1

Client Sample ID:

P-01-013015-0915

Lab Sample ID: Client Matrix:

480-89467-20

Water

Date Sampled: 01/30/2015 0915 Date Received: 10/20/2015 0920

		8270D Semivolatile Org	ganic Compound	s (GC/MS)	
Analysis Method	8270D	Analysis Batch:	480-273999	Instrument ID:	H
Pren Method	3510C	Pren Batch	480.27358B	Lah File ID	W

Prep Method Dilution: Analysis Date: Prep Date:

20 11/10/2015 2115

11/06/2015 1233

Initial Weight/Volume: 255.5 mL

HP5973V V60023.D

Final Weight/Volume: 1 mL Injection Volume: 2 uL

Analyte	Result (ug/L)	Qualifier	MDL	RL
Acenaphthene	17	JH	8.0	98
Acenaphthylene	140	Н	7.4	98
Anthracene	11	JH	5.5	98
Benzo[a]anthracene	ND	H	7.0	98
Benzo[a]pyrene	ND	Н	9.2	98
Benzo[b]fluoranthene	ND	Н	6.7	98
Benzo[g,h,i]perylene	ND	H	6.8	98
Benzo[k]fluoranthene	ND	H	14	98
Chrysene	ND	H	6.5	98
Dibenz(a,h)anthracene	ND	H	8.2	98
Fluoranthene	9.7	JH	7.8	.98
Fluorene	26	JH	7.0	98
ndeno[1,2,3-cd]pyrene	ND	H	9.2	98
Vaphthalene	1400	EH	15	98
Phenanthrene	33	JH	8.6	98
Pyrene	ND	H	6.7	98
Surrogate	%Rec	Qualifier	Accept	ance Limits
2-Fluorobiphenyl	118		48 - 12	0
Nitrobenzene-d5 (Surr)	0	×	46 - 12	0
p-Terphenyl-d14 (Surr)	65	×	67 - 15	0

Client: U.S. Army Construction Engineering Resea

Job Number: 480-89467-1

Client Sample ID:

P-01-013015-0915

Lab Sample ID: Client Matrix:

480-89467-20

Matrix: Water

Date Sampled: 01/30/2015 0915

Date Received:	10/20/2015 092

	82	70D Semivolatile Org	anic Compo	inds (G	C/MS)	
Analysis Method Prep Method	8270D 3510C	Analysis Batch: Prep Batch.	480-274392 480-273586		Instrument ID: Lab File ID:	HP5973V V60048.D
Dilution:	100	Burger			Initial Weight/Volume	
Analysis Date:	11/11/2015 1445	Run Type:	DL		Final Weight/Volume:	
Prep Date:	11/06/2015 1233				Injection Volume:	2 uL
Analyte		Result (u	ig/L)	Qualifie	r MDL	RL
Acenaphthene		ND		H	40	490
Acenaphthylene		140		JH	37	490
Anthracene		ND		H	27	490
Benzo[a]anthrace	ne	ND		Н	35	490
Benzo[a]pyrene		ND		H	46	490
Benzo[b]fluoranth	ene	ND		H	33	490
Benzo[g,h,i]peryle	ne	ND		H H	34	490
Benzo[k]fluoranthe	ene	ND		H	71	490
Chrysene		ND		H	32	490
Dibenz(a,h)anthra	cene	ND		H	41	490
Fluoranthene		ND		H	39	490
Fluorene		ND		H	35	490
Indeno[1,2,3-cd]p	vrene	ND		H	46	490
Naphthalene		1600		H	74	490
Phenanthrene		ND		H	43	490
Pyrene		ND		H	33	490
Surrogate		%Rec		Qualifie	r Accepta	ince Limits
2-Fluorobiphenyl		89			48 - 120)
Nitrobenzene-d5 (Surr)	0	- 3	X	46 - 120)
p-Terphenyl-d14 (Surr)	72			67 - 150)

Client: U.S. Army Construction Engineering Resea

Job Number: 480-89467-1

Client Sample ID:

OS-01-101514-0910

Lab Sample ID:

480-89467-22

Client Matrix:

Waste

Date Sampled: 10/15/2014 0910 Date Received: 10/20/2015 0920

	82	70D Semivolatile Org	anic Compound	s (GC/MS)	
Analysis Method:	8270D	Analysis Batch	480-273506	Instrument ID:	HP5973X
Prep Method	3580A	Prep Batch:	480-273073	Lab File ID:	X009014112.D
Dilution:	100			Initial Weight/Volume:	+0.13 g
Analysis Date:	11/05/2015 1821			Final Weight/Volume:	1 mL
Prep Date:	11/04/2015 1345			Injection Volume:	1 uL

Analyte	DryWt Corrected: N	Result (ug/Kg)	Qualifier	MDL	RL
Acenaphthene		ND	H	3100	260000
Acenaphthylene		470000	H	2200	260000
Anthracene		ND	H	6600	260000
Benzo[a]anthracene		ND	H	4500	260000
Benzo[a]pyrene		ND	H	6300	260000
Benzo[b]fluoranthene		ND	H	5100	260000
Benzo[g,h,i]perylene		ND	H	3100	260000
Benzo[k]fluoranthene		ND	H	2900	260000
Chrysene		ND	H	2600	260000
Dibenz(a,h)anthracene		ND	H	3100	260000
Fluoranthene		190000	JH	3700	260000
Fluorene		300000	H	6000	260000
Indeno[1,2,3-cd]pyrene		ND	H	7200	260000
Naphthalene		1200000	H	4300	260000
Phenanthrene		ND	H	5400	260000
Pyrene		200000	JH	1700	260000
Surrogate		%Rec	Qualifier	Acceptan	ice Limits
2-Fluorobiphenyl		73		37 - 120	
Nitrobenzene-d5 (Surr)		0	X	34 - 132	
p-Terphenyl-d14 (Surr)		78		65 - 153	

Client: U.S. Army Construction Engineering Resea

Job Number: 480-89467-1

Client Sample ID:

WW-01-101514-1120

Lab Sample ID: Client Matrix:

480-89467-1

Water

Date Sampled: 10/15/2014 1120

Date Received:	10/20/2015 0920
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		8021B Volatile Org	anic Compou	inds (G	C)	
Analysis Method: Prep Method Dilution:	8021B 5030B 200	Analysis Batch	480-273207 N/A		Instrument ID: Initial Weight/Volume: Final Weight/Volume:	HP5890-3 44 mL
Analysis Date: Prep Date:	11/05/2015 1133 11/05/2015 1133				Injection Volume Result Type:	1 uL PRIMARY
Analyte		Result (u	ig/L)	Qualifie	r MDL	RL
Benzene		320		H	4.7	40
Toluene		11		JH	7.1	40
Ethylbenzene		ND		H	5.7	40
m,p-Xylene		ND		H	11	80
o-Xylene		ND		H	5.4	40
Xylenes, Total		ND	-	H	11	120
Surrogate		%Rec		Qualifie	r Accepta	nce Limits
a,a,a-Trifluorotolu	ene	139			63 - 145	
4-Bromofluoroben	zene	122			64 - 141	

Client: U.S. Army Construction Engineering Resea

Job Number: 480-89467-1

Client Sample ID:

WW-01-031915-1550

Lab Sample ID: Client Matrix: 480-89467-3

Water

Date Sampled: 03/19/2015 1550

Date Received: 10/20/2015 0920

		8021B Volatile Org	anic Compou	inds (G	C)	
Analysis Method: Prep Method Dilution: Analysis Date: Prep Date:	8021B 5030B 800 11/05/2015 1205 11/05/2015 1205	Analysis Batch:	480-273207 N/A		instrument ID: Initial Weight/Volume: Final Weight/Volume; Injection Volume Result Type;	HP5890-3 44 mL 1 uL PRIMARY
Analyte		Result (u	ig/L)	Qualifie	MDL	RL
Benzene		1500		H	19	160
Toluene		240		H	28	160
Ethylbenzene		ND		H	23	160
m,p-Xylene		75		JH	43	320
o-Xylene		ND		H	22	160
Xylenes, Total		75		JH	43	480
Surrogate		%Rec		Qualifie	r Accepta	nce Limits
a,a,a-Trifluorotolu	ene	138			63 - 145	
4-Bromofluoroben	zene	125			64 - 141	

Client: U.S. Army Construction Engineering Resea

Job Number: 480-89467-1

Client Sample ID:

WW-01-041415-1640

Lab Sample ID: Client Matrix:

480-89467-4

Water

Date Sampled: 04/14/2015 1640

Date	Received	10/20/2015	0920
Date	recourted.	1012012010	0020

		8021B Volatile Org	anic Compour	nds (G	C)	
Analysis Method. Prep Method Dilution: Analysis Date: Prep Date:	8021B 5030B 200 11/05/2015 1238 11/05/2015 1238	Analysis Batch:	480-273207 N/A	1	instrument ID: Initial Weight/Volume: Final Weight/Volume: Injection Volume Result Type;	HP5890-3 44 mL 1 uL PRIMARY
Analyte		Result (u	g/L) (Qualifie	MDL	RL
Benzene		1800	+	1	4.7	40
Toluene		890	+	4	7.1	40
Ethylbenzene		450	+	+	5.7	40
m,p-Xylene		300	1	4	11	80
o-Xylene		ND		4	5.4	40
Xylenes, Total		300)	+	11	120
Surrogate		%Rec	Ó	Qualifie	r Accepta	nce Limits
a,a,a-Trifluorotolu	ene	104			63 - 145	
4-Bromofluoroben	zene	96			64 - 141	

Client: U.S. Army Construction Engineering Resea

Job Number: 480-89467-1

Client Sample ID:

WW-01-050615-1552

Lab Sample ID: Client Matrix: 480-89467-7

atrix: Water

Date Sampled: 05/06/2015 1552 Date Received: 10/20/2015 0920

		8021B Volatile Org	anic Compour	nds (GC	()	
Analysis Method. Prep Method Dilution: Analysis Date Prep Date:	8021B 5030B 200 11/05/2015 1310 11/05/2015 1310	Analysis Batch:	480-273207 N/A	F	nstrument ID: nitial Weight/Volume: Final Weight/Volume: njection Volume Result Type;	HP5890-3 44 mL 1 uL PRIMARY
Analyte		Result (u	ig/L) C	Qualifier	MDL	RL
Benzene		1900	+	4	4.7	40
Toluene		1400	+	4	7.1	40
Ethylbenzene		890	+	+	5.7	40
m,p-Xylene		2200	1	4	11	80
o-Xylene		ND	H	4	5.4	40
Xylenes, Total		2200		+	31.	120
Surrogate		%Rec		Qualifier	Accepta	nce Limits
a,a,a-Trifluorotolu	ene	125			63 - 145	
4-Bromofluoroben	zene	116			64 - 141	

Client: U.S. Army Construction Engineering Resea

Job Number: 480-89467-1

Client Sample ID:

WW-01-052015-1500

Lab Sample ID: Client Matrix:

480-89467-9 Water

Date Sampled: 05/20/2015 1500 Date Received: 10/20/2015 0920

		8021B Volatile Org	anic Compou	nds (G	C)		
Analysis Method Prep Method Dilution: Analysis Date Prep Date:	8021B 5030B 200 11/05/2015 1841 11/05/2015 1841	Analysis Batch:	480-273207 N/A		nstrument ID: Initial Weight/Volume: Final Weight/Volume: Injection Volume Result Type;		
Analyte		Result (u	ig/L) (Qualifie	MDL	RL	
Benzene		670	,	Н	4.7	40	
Toluene		87		H	7.1	40	
Ethylbenzene		ND	1	H	5.7	40	
m,p-Xylene		55	14	JH.	11	80	
o-Xylene		160	1	H	5.4	40	
Xylenes, Total		220)	H	11	120	
Surrogate		%Rec		Qualifie	r Accepta	nce Limits	
a,a,a-Trifluorotoluene		109					
4-Bromofluorobenzene		91	91		64 - 141		

Client: U.S. Army Construction Engineering Resea

Job Number: 480-89467-1

Client Sample ID:

P-01-031315-1531

Lab Sample ID: Client Matrix: 480-89467-11

Water

Date Sampled: 03/13/2015 1531 Date Received: 10/20/2015 0920

		8021B Volatile Org	anic Compou	inds (G	C)		
Analysis Method Prep Method Dilution: Analysis Date Prep Date:	8021B 5030B 2000 11/05/2015 1510 11/05/2015 1510	Analysis Batch	480-273207 N/A		instrument ID: initial Weight/Volume: Final Weight/Volume: Injection Volume Result Type;	HP5890-3 44 mL 1 uL PRIMARY	
Analyte		Result (u	ig/L)	Qualifie	MDL	RL	
Benzene		2400		H	47	400	
Toluene		260		JH	71	400	
Ethylbenzene		ND		H	57	400	
m,p-Xylene		110		JH	110	800	
o-Xylene		ND		H	54	400	
Xylenes, Total		110		TH	110	1200	
Surrogate		%Rec		Qualifie	Acceptar	nce Limits	
a,a,a-Trifluorotoluene		94	94		63 - 145		
4-Bromofluorobenzene		88	88 64 - 14		64 - 141		

Client: U.S. Army Construction Engineering Resea

Job Number: 480-89467-1

Client Sample ID:

P-01-050615-1552

Lab Sample ID:

480-89467-12

Client Matrix: Water

Date Sampled: 05/06/2015 1552 Date Received: 10/20/2015 0920

		8021B Volatile Org	anic Compou	inds (G	C)	
Analysis Method: 8021B Prep Method: 5030B Dilution: 400		Analysis Batch: 480-273207 N/A		Initial Weight/Volume: Final Weight/Volume:		
Analysis Date: Prep Date:	11/05/2015 1614 11/05/2015 1614				Injection Volume Result Type:	1 uL PRIMARY
Analyte		Result (u	ig/L)	Qualifie	r MDL	RL
Benzene		1400		H	9.3	80
Toluene		120		H	14	80
Ethylbenzene		ND		H	11	80
m,p-Xylene		50		JH	22	160
o-Xylene		ND		H	11	80
Xylenes, Total		50		TH	22	240
Surrogate		%Rec		Qualifie	r Accepta	nce Limits
a,a,a-Trifluorotoluene		135		63 - 145		
4-Bromofluorobenzene		123	123		64 - 141	

Client: U.S. Army Construction Engineering Resea

Job Number: 480-89467-1

Client Sample ID: P-01-040115-1600

Lab Sample ID: Client Matrix:

480-89467-21

Water

Date Sampled: 04/01/2015 1600

	District Control of the Control of t	
Date	Received:	10/20/2015 0920

		8021B Volatile Org	anic Compour	nds (G	C)		
Analysis Method: 8021B: Prep Method: 5030B Dilution: 800 Analysis Date: 11/05/2015 1645		Analysis Batch: 480-273207 N/A		7 Instrument ID: Initial Weight/Volume: Final Weight/Volume: Injection Volume		HP5890-3 44 mL 1 uL	
Prep Date:	11/05/2015 1645			- 4	Result Type:	PRIMARY	
Analyte		Result (u	g/L) C	Qualifie	MDL	RL	
Benzene		14000	+	1	19	160	
Toluene		5500	+	+	28	160	
Ethylbenzene		3700	+	1	23	160	
m,p-Xylene		7700	+	4	43	320	
o-Xylene		ND	F	1	22	160	
Xylenes, Total		7700		4	43	480	
Surrogate		%Rec		Qualifie	. Accepta	ince Limits	
a a a-Trifluorotoluene		131	131		63 - 145		
4-Bromofluorobenzene		125		64 - 141			

Analytical Data

Client: U.S. Army Construction Engineering Resea

Job Number: 480-89467-1

Client Sample ID: P-01-012215-0948

Lab Sample ID: Client Matrix:

480-89467-23

Water

Date Sampled: 01/22/2015 0948

	Date Received:	10/20/2015 0920

		8021B Volatile Org	anic Compou	inds (G	C)	
Analysis Method: Prep Method Dilution: Analysis Date: Prep Date:	8021B 5030B 800 11/05/2015 1913 11/05/2015 1913	Analysis Batch	480-273207 N/A		Instrument ID: Initial Weight/Volume Final Weight/Volume Injection Volume Result Type;	
Analyte		Result (u	ig/L)	Qualifie	r MDL	RL
Benzene		160		H	0.42	3.6
Toluene		7.9		н	0,65	3,6
Ethylbenzene		ND		H	0.52	3.6
m,p-Xylene		6.8		JH	0.98	7.3
o-Xylene		ND		H	0.49	3.6
Xylenes, Total		6.8		TH	0.98	11
Surrogate		%Rec		Qualifie	r Accepta	ance Limits
a,a,a-Trifluorotolu	ene	124			63 - 14	5
4-Bromofluoroben	zene	114			64 - 14	1

Analytical Data

Client: U.S. Army Construction Engineering Resea

Job Number: 480-89467-1

Client Sample ID:

Analysis Method:

Prep Method

Dilution:

WW-01-031315-1531

Lab Sample ID: Client Matrix: 480-89467-24

Water

Date Sampled: 03/13/2015 1531 Date Received: 10/20/2015 0920

HP5890-3

8021B Volatile Organic Compounds (GC)							
8021B	Analysis Batch	480-273207	Instrument ID:				
5030B		N/A	Initial Weight/Volume:				
200			Final Weight/Volume:				

Analysis Date: 11/05/2015 1944 Prep Date: 11/05/2015 1944 Initial Weight/Volume: 44 mL Final Weight/Volume: 1.0 mL Injection Volume: 1 uL Result Type: PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
Benzene	12	H	0.11	0.91
Toluene	1.4	н	0.16	0.91
Ethylbenzene	ND	H	0.13	0.91
m,p-Xylene	ND	H	0.25	1.8
o-Xylene	3.7	H	0.12	0.91
Xylenes, Total	3.7	H	0.25	2.7
Surrogate	%Rec	Qualifier	Accept	ance Limits
a a a-Trifluorotoluene	146	X	83.14	5

Job Number: 480-89467-1

Client: U.S. Army Construction Engineering Resea

Surrogate Recovery Report

8270D Semivolatile Organic Compounds (GC/MS)

Client Matrix: Waste

Lab Sample ID	Client Sample ID	NBZ %Rec	FBP %Rec	TPH %Rec
480-89467-14	OS-01-031815-1530	65	94	94
480-89467-15	OS-01-042415-1600	88	102	101
480-89467-16	OS-01-042815-1600	OX	83	81
480-89467-17	OS-01-050715-1630	94	97	103
480-89467-22	OS-01-101514-0910	OX	73	78
MB 480-273073/1-A		86	98	99
LCS 480-273073/2-A		79	93	102
LCSD 480-273073/3-A		82	93	96

Surrogate	Acceptance Limits	
NBZ = Nitrobenzene-d5 (Surr)	34-132	
FBP = 2-Fluorobiphenyl	37-120	
TPH = p-Terphenyl-d14 (Surr)	65-153	

TestAmerica Buffalo

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Job Number: 480-89467-1

Client: U.S. Army Construction Engineering Resea

Surrogate Recovery Report

8270D Semivolatile Organic Compounds (GC/MS)

Client Matrix: Water

Lab Sample ID	Client Sample ID	NBZ %Rec	FBP %Rec	TPH %Rec
480-89467-2	WW-02-030515-1557	152X	101	76
480-89467-5	WW-01-030515-1352	76	91	73
480-89467-6	WW-01-042815-1600	106	106	85
480-89467-6 DL	WW-01-042815-1600 DL	OX	99	104
480-89467-8	WW-01-050715-1600	OX	98	72
480-89467-8 DL	WW-01-050715-1600 DL	0X	87	76
480-89467-10	P-01-030515-1557	OX	81	67
480-89467-13	P-01-051315-1530	0X	95	83
480-89467-18	P-01-101514-0910	OX	93	74
480-89467-19	P-01-100814-1120	OX	94	98
480-89467-20	P-01-013015-0915	OX	118	65X
480-89467-20 DL	P-01-013015-0915 DL	OX	89	72
MB 480-273586/1-A		82	86	99
LCS 480-273586/2-A		83	83	98

Surrogate	Acceptance Limit	
NBZ = Nitrobenzene-d5 (Surr)	46-120	
FBP = 2-Fluorobiphenyl	48-120	
TPH = p-Terphenyl-d14 (Surr)	67-150	

TestAmerica Buffalo

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Job Number: 480-89467-1

Client: U.S. Army Construction Engineering Resea

Surrogate Recovery Report

8021B Volatile Organic Compounds (GC)

Client Matrix: Water

Lab Sample ID	Client Sample ID	TFT1 %Rec	BFB1 %Rec
480-89467-1	WW-01-101514-1120	139	122
480-89467-3	WW-01-031915-1550	138	125
480-89467-4	WW-01-041415-1640	104	96
480-89467-7	WW-01-050615-1552	125	116
480-89467-9	VVV-01-052015-1500	109	91
480-89467-11	P-01-031315-1531	94	88
480-89467-12	P-01-050615-1552	135	123
480-89467-21	P-01-040115-1600	131	125
480-89467-23	P-01-012215-0948	124	114
480-89467-24	WW-01-031315-1531	146X	126
MB 480-273207/3		128	123
LCS 480-273207/4		127	119
LCSD 480-273207/5		133	125

Surrogate	Acceptance Limits
TFT = a,a,a-Trifluorotoluene	63-145
BEB = 4-Bromofluorobenzene	64-141

TestAmerica Buffalo

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Job Number: 480-89467-1

Client: U.S. Army Construction Engineering Resea

Method Blank - Batch: 480-273073

Method: 8270D Preparation: 3580A

Lab Sample ID: Client Matrix: Dilution: Analysis Date:

MB 480-273073/1-A Waste 1.0

11/05/2015 1513 11/04/2015 1345

480-273506 Analysis Batch: Prep Batch: 480-273073 Leach Batch N/A Units: ug/Kg

Instrument ID: Lab File ID: Initial Weight/Volume: 0.10 g Final Weight/Volume: 1 mL

Injection Volume:

HP5973X X009014105.D

1 uL

Prep Date: Leach Date: N/A

Analyte	Result	Qual	MDL	RL
Acenaphthene	ND		40	3400
Acenaphthylene	ND		28	3400
Anthracene	ND		86	3400
Benzo[a]anthracene	ND		58	3400
Benzo[a]pyrene	ND		82	3400
Benzo[b]fluoranthene	ND		66	3400
Benzo[g,h,i]perylene	ND		40	3400
Benzo[k]fluoranthene	ND		38	3400
Chrysene	ND		34	3400
Dibenz(a,h)anthracene	ND		40	3400
Fluoranthene	ND		48	3400
Fluorene	ND		78	3400
ndeno[1,2,3-cd]pyrene	ND		94	3400
Naphthalene	ND		56	3400
Phenanthrene	ND		70	3400
Pyrene	ND		22	3400
Surrogate	% Rec		Acceptance Limits	i
2-Fluorobiphenyl	98		37 - 120	
Nitrobenzene-d5 (Surr)	86		34 - 132	
p-Terphenyl-d14 (Surr)	99		65 - 153	

Job Number: 480-89467-1

Client: U.S. Army Construction Engineering Resea

Lab Control Sample/ Method: 8270D
Lab Control Sample Duplicate Recovery Report - Batch: 480-273073 Preparation: 3580A

LCS Lab Sample	ID: LCS 480-273073/2-A	Analysis Batch:	480-273506	Instrument ID:	HP5973X
Client Matrix:	Waste	Prep Batch:	480-273073	Lab File ID:	X009014106.D
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	0.10 g
Analysis Date:	11/05/2015 1540	Units:	ug/Kg	Final Weight/Volume:	1 mL
Prep Date:	11/04/2015 1345		4	Injection Volume:	1 uL
Leach Date:	N/A				
LCSD Lab Samp	le ID: LCSD 480-273073/3-A	Analysis Batch:	480-273506	Instrument ID:	HP5973X
Client Matrix:	Waste	Prep Batch:	480-273073	Lab File ID:	X009014107.D
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	0.10 g
Analysis Date:	11/05/2015 1607	Units:	ug/Kg	Final Weight/Volume:	1 mL
Prep Date:	11/04/2015 1345			Injection Volume:	1 uL
Leach Date:	N/A				

	9	% Rec.						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual	
Acenaphthene	92	91	53 - 120	1	35			
Acenaphthylene	91	90	58 - 121	0	18			
Anthracene	103	98	62 - 129	5	15			
Benzo[a]anthracene	100	94	65 - 133	7	15			
Benzo[a]pyrene	99	94	64 - 127	5	15			
Benzo[b]fluoranthene	98	93	64 - 135	5	15			
Benzo[g,h,i]perylene	102	96	50 - 152	5	15			
Benzo[k]fluoranthene	103	98	58 - 138	5	22			
Chrysene	98	93	64 - 131	5	15			
Dibenz(a,h)anthracene	101	96	54 - 148	5	15			
Fluoranthene	101	97	62 - 131	3	15			
Fluorene	97	94	63 - 126	3	15			
Indeno[1,2,3-cd]pyrene	101	95	56 - 149	6	15			
Naphthalene	88	86	46 - 120	2	29			
Phenanthrene	104	99	60 - 130	5	15			
Pyrene	103	96	51 - 133	8	35			
Surrogate	- 0	CS % Rec	LCSD %	Rec	Accep	tance Limits		
2-Fluorobiphenyl	9	3	93		3	7 - 120		
Nitrobenzene-d5 (Surr)	7	9	82		3	4 - 132		
p-Terphenyl-d14 (Surr)	1	02	96		6	5 - 153		

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Job Number: 480-89467-1

Client: U.S. Army Construction Engineering Resea

Laboratory Control/ Laboratory Duplicate Data Report - Batch: 480-273073

Method: 8270D Preparation: 3580A

LCS Lab Sample ID: LCS 480-273073/2-A

Units: ug/Kg

LCSD Lab Sample ID LCSD 480-273073/3-A

Client Matrix:

Client Matrix:

Waste

Dilution:

Waste

Dilution. 1.0

Analysis Date: Prep Date:

11/05/2015 1540 11/04/2015 1345

Analysis Date: 11/05/2015 1607 11/04/2015 1345 Prep Date:

Leach Date:

N/A

Leach Date: N/A

Analyte	LCS Spike Amount	LCSD Spike Amount	LCS Result/Qual	LCSD Result/Qual
Acenaphthene	500000	500000	460000	455000
Acenaphthylene	500000	500000	453000	452000
Anthracene	500000	500000	517000	492000
Benzo[a]anthracene	500000	500000	502000	469000
Benzo[a]pyrene	500000	500000	497000	471000
Benzo[b]fluoranthene	500000	500000	488000	466000
Benzo[g,h,i]perylene	500000	500000	508000	482000
Benzo[k]fluoranthene	500000	500000	514000	491000
Chrysene	500000	500000	492000	467000
Dibenz(a,h)anthracene	500000	500000	506000	481000
Fluoranthene	500000	500000	503000	486000
Fluorene	500000	500000	483000	469000
ndeno[1,2,3-cd]pyrene	500000	500000	505000	474000
Naphthalene	500000	500000	438000	428000
Phenanthrene	500000	500000	518000	495000
Pyrene	500000	500000	516000	478000

Method: 8270D Preparation: 3510G

Job Number: 480-89467-1

Client: U.S. Army Construction Engineering Resea

Method Blank - Batch: 480-273586

MB 480-273586/1-A Lab Sample ID: 480-273910 Instrument ID: HP5973V Analysis Batch: Client Matrix: Prep Batch: 480-273586 Lab File ID: V54275.D Water Dilution: 1.0 Leach Batch: N/A Initial Weight/Volume: 250 mL Analysis Date: 11/09/2015 1426 Units: ug/L Final Weight/Volume: 1 mL Prep Date: 11/06/2015 1233 Injection Volume: 2 uL Leach Date: N/A

Analyte	Result	Qual	MDL	RL
Acenaphthene	ND		0.41	5.0
Acenaphthylene	ND		0.38	5.0
Anthracene	ND		0.28	5.0
Benzo[a]anthracene	ND		0.36	5.0
Benzo[a]pyrene	ND		0.47	5.0
Benzo[b]fluoranthene	ND		0.34	5.0
Benzo[g,h,i]perylene	ND		0.35	5.0
Benzo[k]fluoranthene	ND		0.73	5.0
Chrysene	ND		0.33	5.0
Dibenz(a,h)anthracene	ND		0.42	5.0
Fluoranthene	ND		0.40	5.0
Fluorene	ND		0.36	5.0
ndeno[1,2,3-cd]pyrene	ND		0.47	5.0
Naphthalene	ND		0.76	5.0
Phenanthrene	ND		0.44	5.0
Pyrene	ND		0.34	5.0
Surrogate	% Rec		Acceptance Limits	
2-Fluorobiphenyl	86		48 - 120	
Nitrobenzene-d5 (Surr)	82		46 - 120	
p-Terphenyl-d14 (Surr)	99		67 - 150	

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Job Number: 480-89467-1

Client: U.S. Army Construction Engineering Resea

Lab Control Sample - Batch: 480-273586

N/A

Method: 8270D Preparation: 3510C

Lab Sample ID: LCS 480-273586/2-A Client Matrix: Water 1.0 Dilution: Analysis Date:

Prep Date:

Leach Date:

11/09/2015 1456

11/06/2015 1233

Analysis Batch: Prep Batch: Leach Batch Units:

480-273910 480-273586 N/A ug/L

Instrument ID: HP5973V Lab File ID: V54276.D Initial Weight/Volume: 250 mL Final Weight/Volume: 1 mL Injection Volume: 2 uL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Acenaphthene	16.0	14.5	91	60 - 120	
Acenaphthylene	16.0	14.7	92	63 - 120	
Anthracene	16.0	14.8	92	58 - 148	
Benzo[a]anthracene	16.0	15.0	94	55 - 151	
Benzo[a]pyrene	16.0	14.5	90	60 - 145	
Benzo[b]fluoranthene	16.0	14.5	91	54 - 140	
Benzo[g,h,i]perylene	16.0	17.1	107	66 - 152	
Benzo[k]fluoranthene	16.0	14.4	90	51 - 153	
Chrysene	16.0	15.0	93	69 - 140	
Dibenz(a,h)anthracene	16.0	15,9	99	57 - 148	
Fluoranthene	16.0	15.4	96	55 - 147	
luorene	16.0	15.0	94	55 - 143	
ndeno[1,2,3-cd]pyrene	16.0	15.8	99	69 - 146	
Vaphthalene	16.0	12.8	80	35 - 130	
Phenanthrene	16.0	14,9	93	57 - 147	
Pyrene	16.0	15,5	97	58 - 136	
Surrogate	%	Rec	Α	oceptance Limits	
2-Fluorobiphenyl	8	3		48 - 120	
Vitrobenzene-d5 (Surr)	8	3		46 - 120	
p-Terphenyl-d14 (Surr)	9	8		67 - 150	

Job Number: 480-89467-1

Client: U.S. Army Construction Engineering Resea

Method Blank - Batch: 480-273207 Method: 8021B
Preparation: 5030B

Analysis Batch: Prep Batch: Leach Batch: Units:	480-273207 N/A N/A ug/L	Lab File Initial W Final W Injection	ID: leight/Volume; eight/Volume; i Volume;	HP5890-3 3_69023.D 44 mL 1 uL PRIMARY
Resu	ult	Qual	MDL	RL
ND			0.023	0.20
ND			0.036	0.20
ND			0.029	0.20
				0.40
				0.20
ND			0.054	0,60
96 1	Rec	- 0	Acceptance Lin	nits
17	28		63 - 145	
12	23		64 - 141	
LCS % R	lec LCS	D % Rec	Accep	tance Limits
127	133		63	3 - 145
119	125		64	4 - 141
	Prep Batch: Leach Batch: Units: Resi ND ND ND ND ND ND 1: 1: LCS % R	Prep Batch: N/A Leach Batch: N/A Units: ug/L Result ND ND ND ND ND ND ND ND ND ND LD ND ND LD ND ND ND LD ND	Prep Batch: N/A Lab File Leach Batch: N/A Initial W Units: ug/L Final W Injection Column Result Qual ND ND ND ND ND ND	Prep Batch: N/A Lab File ID: Leach Batch: N/A Initial Weight/Volume: Units: ug/L Final Weight/Volume: Injection Volume: Injection Volume: Loolumn ID: ND 0.023 ND 0.036 ND ND 0.029 ND 0.054 ND 0.054 ND 0.054 ND 0.054 Acceptance Lin 128 63 - 145 64 - 141 LCS % Rec LCSD % Rec Acceptance Acceptance 127 133 65

DATA REPORTING QUALIFIERS

Job Number: 480-89467-1

Client: U.S. Army Construction Engineering Resea

Lab Section	Qualifier	Description
GC/MS Semi VOA		
	E	Result exceeded calibration range,
	J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
	Н	Sample was prepped or analyzed beyond the specified holding time
	X	Surrogate is outside control limits
GC VOA		
	j	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
	H	Sample was prepped or analyzed beyond the specified holding time
	X	Surrogate is outside control limits

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Job Number: 480-89467-1

Client: U.S. Army Construction Engineering Resea

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
GC/MS Semi VOA					
Prep Batch: 480-27307	3				
LCS 480-273073/2-A	Lab Control Sample	T	Waste	3580A	
LCSD 480-273073/3-A	Lab Control Sample Duplicate	T	Waste	3580A	
MB 480-273073/1-A	Method Blank	Ť Ť Ť	Waste	3580A	
180-89467-14	OS-01-031815-1530	T	Waste	3580A	
180-89467-15	OS-01-042415-1600	T	Waste	3580A	
80-89467-16	OS-01-042815-1600	T	Waste	3580A	
180-89467-17	OS-01-050715-1630	T	Waste	3580A	
180-89467-22	OS-01-101514-0910	T	Waste	3580A	
Analysis Batch:480-27	3506				
CS 480-273073/2-A	Lab Control Sample	T	Waste	8270D	480-273073
CSD 480-273073/3-A	Lab Control Sample Duplicate	Ţ	Waste	8270D	480-273073
/IB 480-273073/1-A	Method Blank	T	Waste	8270D	480-273073
80-89467-14	OS-01-031815-1530	T	Waste	8270D	480-273073
80-89467-15	OS-01-042415-1600	Ť	Waste	8270D	480-273073
80-89467-16	OS-01-042815-1600	T	Waste	8270D	480-273073
80-89467-17	OS-01-050715-1630	T	Waste	8270D	480-273073
180-89467-22	OS-01-101514-0910	T	Waste	8270D	480-273073
Prep Batch: 480-27358	6				
CS 480-273586/2-A	Lab Control Sample	T	Water	3510C	
VIB 480-273586/1-A	Method Blank	Ţ	Water	3510C	
180-89467-2	VVV-02-030515-1557	T	Water	3510C	
80-89467-5	WW-01-030515-1352	T	Water	3510C	
180-89467-6	WW-01-042815-1600	T	Water	3510C	
80-89467-6DL	WW-01-042815-1600	T	Water	3510C	
180-89467-8	WW-01-050715-1600	T	Water	3510C	
180-89467-8DL	VVV-01-050715-1600	T	Water	3510C	
180-89467-10	P-01-030515-1557	T	Water	3510C	
180-89467-13	P-01-051315-1530	T	Water	3510C	
180-89467-18	P-01-101514-0910	T	Water	3510C	
80-89467-19	P-01-100814-1120	T	Water	3510C	
80-89467-20	P-01-013015-0915	T	Water	3510C	
180-89467-20DL	P-01-013015-0915	T	Water	3510C	
Analysis Batch:480-27	3910				
CS 480-273586/2-A	Lab Control Sample	T	Water	8270D	480-273586
MB 480-273586/1-A	Method Blank	T	Water	8270D	480-273586

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Job Number: 480-89467-1

Client: U.S. Army Construction Engineering Resea

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
GC/MS Semi VOA					
Analysis Batch:480-2	73999				
480-89467-2	WW-02-030515-1557	T	Water	8270D	480-273586
480-89467-5	WW-01-030515-1352	T	Water	8270D	480-273586
480-89467-6	WW-01-042815-1600	T	Water	8270D	480-273586
180-89467-8	VVVV-01-050715-1600	Ţ	Water	8270D	480-273586
480-89467-10	P-01-030515-1557	T	Water	8270D	480-273586
180-89467-13	P-01-051315-1530	T	Water	8270D	480-273586
480-89467-18	P-01-101514-0910	T	Water	8270D	480-273586
180-89467-19	P-01-100814-1120	T	Water	8270D	480-273586
480-89467-20	P-01-013015-0915	T	Water	8270D	480-273586
Analysis Batch:480-2	74392				
480-89467-6DL	WW-01-042815-1600	T	Water	8270D	480-273586
480-89467-8DL	WW-01-050715-1600	T	Water	8270D	480-273586
480-89467-20DL	P-01-013015-0915	Ť	Water	8270D	480-273586
Report Basis T = Total					
GC VOA					
Analysis Batch:480-26	66158			8021B	
1. 7. 8				00210	
Analysis Batch: 480-2		_			
LCS 480-273207/4	Lab Control Sample	Ţ	Water	8021B	
CSD 480-273207/5	Lab Control Sample Duplicate	T	Water	8021B	
MB 480-273207/3	Method Blank	Ţ	Water	8021B	
180-89467-1	WW-01-101514-1120	T	Water	8021B	
180-89467-3	WW-01-031915-1550	T	Water	8021B	
180-89467-4	WW-01-041415-1640	T	Water	8021B	
180-89467-7	WW-01-050615-1552	T	Water	8021B	
180-89467-9	WWV-01-052015-1500	T	Water	8021B	
180-89467-11	P-01-031315-1531	T T T	Water	8021B	
180-89467-12	P-01-050615-1552	T	Water	8021B	
180-89467-21	P-01-040115-1600		Water	8021B	
180-89467-23	P-01-012215-0948	T	Water	8021B	
480-89467-24	WW-01-031315-1531	Т	Water	8021B	

Report Basis T = Total

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Job Number: 480-89467-1

Client: U.S. Army Construction Engineering Resea

Laboratory Chronicle

Lab ID: 480-89467-1 Client ID: WW-01-101514-1120

Sample Date/Time: 10/15/2014 11:20 Received Date/Time: 10/20/2015 09:20

Analysis Date Prepared / Method Bottle ID Batch Prep Batch Analyzed Analyst P:5030B 480-89467-B-1 480-273207 11/05/2015 11:33 200 TAL BUF JRL A:8021B 480-89467-B-1 480-273207 11/05/2015 11:33 200 TAL BUF JRL

Lab ID: 480-89467-2 Client ID: WW-02-030515-1557

Sample Date/Time: 03/05/2015 15:57 Received Date/Time: 10/20/2015 09:20

Analysis Date Prepared / Method Bottle ID Run Batch Prep Batch Analyzed Dil Lab Analyst P:35100 480-89467-B-2-A 480-273999 480-273586 11/06/2015 12:33 TAL BUF CPH A:8270D 480-89467-B-2-A 480-273999 480-273586 11/10/2015 17:23 TAL BUF DMR

Lab ID: 480-89467-3 Client ID: WW-01-031915-1550

Sample Date/Time: 03/19/2015 15:50 Received Date/Time: 10/20/2015 09:20

Date Prepared / Analysis Bottle ID Batch Analyzed Method Run Prep Batch Dil Lab Analyst P:5030B 480-89467-B-3 480-273207 11/05/2015 12:05 TAL BUF JRL A 8021B 480-89467-B-3 480-273207 11/05/2015 12:05 TAL BUF JRL 800

Lab ID: 480-89467-4 Client ID: WW-01-041415-1640

Sample Date/Time: 04/14/2015 16:40 Received Date/Time: 10/20/2015 09:20

Date Prepared / Analysis Method Bottle ID Batch Prep Batch Analyzed Analyst P:5030B 480-89467-B-4 480-273207 11/05/2015 12:38 JRL TAL BUI A:8021B 480-89467-B-4 480-273207 11/05/2015 12:38 200 TAL BUF JRL

Lab ID: 480-89467-5 Client ID: WW-01-030515-1352

Sample Date/Time: 03/05/2015 13:52 Received Date/Time: 10/20/2015 09:20

Analysis Date Prepared / Method Bottle ID Batch Analyzed Run Prep Batch Dil Lab Analyst P:35100 480-89467-B-5-A 480-273999 480-273586 11/06/2015 12:33 TAL BUP 480-89467-B-5-A 480-273999 480-273586 11/10/2015 17:52 A:8270D TAL BUF DMR

Lab ID: 480-89467-6 Client ID: WW-01-042815-1600

Sample Date/Time: 04/28/2015 16:00 Received Date/Time: 10/20/2015 09:20

Analysis Date Prepared / Analyzed Method Bottle ID Run Batch Prep Batch Dil Lab Analyst P:35100 480-89467-B-6-A 480-273999 480-273586 11/06/2015 12:33 TAL BUF 20 A:8270D 480-89467-B-6-A 480-273999 480-273586 11/10/2015 18:21 20 TAL BUF DMR P:3510C 480-89467-B-6-A DL 480-274392 480-273586 11/06/2015 12:33 100 TAL BUF CPH. A:8270D 480-89467-B-6-A DL 480-274392 480-273586 11/11/2015 13:47 100 TAL BUF DMR

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Job Number: 480-89467-1

Client: U.S. Army Construction Engineering Resea

Laboratory Chronicle

Lab ID: 480-89467-7 Client ID: WW-01-050615-1552

Sample Date/Time: 05/08/2015 15:52 Received Date/Time: 10/20/2015 09:20

Analysis Date Prepared / Method Bottle ID Batch Prep Batch Analyzed Analyst P:5030B 480-89467-B-7 480-273207 11/05/2015 13:10 200 TAL BUF JRL A:8021B 480-89467-B-7 480-273207 11/05/2015 13:10 200 TAL BUF JRL

Lab ID: 480-89467-8 Client ID: WW-01-050715-1600

Sample Date/Time: 05/07/2015 16:00 Received Date/Time: 10/20/2015 09:20

Analysis Date Prepared / Method Bottle ID Run Batch Prep Batch Analyzed Dil Analyst Lab P:35100 480-89467-B-8-A 480-273999 480-273586 11/06/2015 12:33 TAL BUF CPH A:8270D 480-89467-B-8-A 480-273999 480-273586 11/10/2015 18:50 TAL BUF DMR 20 P:3510C 480-89467-B-8-A DL 480-274392 480-273586 11/06/2015 12:33 100 TAL BUF CPH A:8270D TAL BUF 480-89467-B-8-A DL 480-274392 480-273586 11/11/2015 14:16 100 DMR

Lab ID: 480-89467-9 Client ID: WW-01-052015-1500

Sample Date/Time: 05/20/2015 15:00 Received Date/Time: 10/20/2015 09:20

Analysis Date Prepared / Batch Analyzed Method Bottle ID Run Prep Batch Dil Analyst Lab 11/05/2015 18:41 200 TAL BUF A:8021B 480-89467-B-9 480-273207 11/05/2015 18:41 200 TAL BUF JRL

Lab ID: 480-89467-10 Client ID: P-01-030515-1557

Sample Date/Time 03/05/2015 15:57 Received Date/Time: 10/20/2015 09:20

Analysis Date Prepared / Batch Analyzed Method Bottle ID Run Prep Batch Lab Analyst P:3510C 480-89467-B-10-A 480-273586 480-273999 11/06/2015 12:33 TAL BUF CPH A 8270D 480-89467-B-10-A 480-273999 480-273586 11/10/2015 19:19 TAL BUF DMR

Lab ID: 480-89467-11 Client ID: P-01-031315-1531

Sample Date/Time: 03/13/2015 15:31 Received Date/Time: 10/20/2015 09:20

Analysis Date Prepared / Method Bottle ID Batch Prep Batch Analyzed Analyst P:5030B 480-273207 11/05/2015 15:10 480-89467-B-11 2000 TAL BUF JRL A:8021B 480-89467-B-11 480-273207 11/05/2015 15:10 2000 TAL BUF

Lab ID: 480-89467-12 Client ID: P-01-050615-1552

Sample Date/Time: 05/06/2015 15:52 Received Date/Time: 10/20/2015 09:20

Analysis Date Prepared / Batch Analyzed Method Bottle ID Run Prep Batch Dil Analyst Lab P.5030B 480-89467-B-12 480-273207 11/05/2015 16:14 400 TAL BUF JRL 480-89467-B-12 JRL A:8021B 480-273207 11/05/2015 16:14 400 TAL BUF

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Job Number: 480-89467-1

Client: U.S. Army Construction Engineering Resea

Laboratory Chronicle

Lab ID:	480-89467-13	Client ID:	P-01-051315-1530

Sample Date/Time: 05/13/2015 15:30 Received Date/Time: 10/20/2015 09:20

			Analysis		Date Prepared /			
Method	Bottle ID	Run	Batch	Prep Batch	Analyzed	Dil	Lab	Analyst
P:3510C	480-89467-B-13-A		480-273999	480-273586	11/06/2015 12:33	20	TAL BUF	CPH
A:8270D	480-89467-B-13-A		480-273999	480-273586	11/10/2015 19:48	20	TAL BUF	DMR

Lab ID: 480-89467-14 Client ID: OS-01-031815-1530

Sample Date/Time: 03/18/2015 15:30 Received Date/Time: 10/20/2015 09:20

Method	Bottle ID	Run	Analysis Batch	Prep Batch	Date Prepared / Analyzed	Dil	Lab	Analyst
P:3580A	480-89467-A-14-A		480-273506	480-273073	11/04/2015 13:45	100	TAL BUF	CAM
A:8270D	480-89467-A-14-A		480-273506	480-273073	11/05/2015 16:34	100	TAL BUF	CAS

Lab ID: 480-89467-15 Client ID: OS-01-042415-1600

Sample Date/Time: 04/24/2015 16:00 Received Date/Time: 10/20/2015 09:20

			Analysis		Date Prepared /			
Method	Bottle ID	Run	Batch	Prep Batch	Analyzed	Dil	Lab	Analyst
P:3580A	480-89467-A-15-A		480-273506	480-273073	11/04/2015 13:45	10	TAL BUF	CAM
A:8270D	480-89467-A-15-A		480-273506	480-273073	11/05/2015 17:01	10	TAL BUF	CAS

Lab ID: 480-89467-16 Client ID: OS-01-042815-1600

Sample Date/Time: 04/28/2015 16:00 Received Date/Time: 10/20/2015 09:20

Analysis Date Prepared / Analyzed Method Bottle ID Batch Prep Batch Analyst P:3580A 480-89467-A-16-A 11/04/2015 13:45 CAM TAL BUE A:8270D 480-89467-A-16-A 480-273506 480-273073 11/05/2015 17:28 TAL BUF CAS

Lab ID: 480-89467-17 Client ID: OS-01-050715-1630

Sample Date/Time: 05/07/2015 16:30 Received Date/Time: 10/20/2015 09:20

Method	Bottle ID	Run	Analysis Batch	Prep Batch	Date Prepared I Analyzed	Dil	Lab	Analyst
P:3580A	480-89467-A-17-A		480-273506	480-273073	11/04/2015 13:45	100	TAL BUF	CAM
A:8270D	480-89467-A-17-A		480-273506	480-273073	11/05/2015 17:55	100	TAL BUF	CAS

Lab ID: 480-89467-18 Client ID: P-01-101514-0910

Sample Date/Time: 10/15/2014 09:10 Received Date/Time: 10/20/2015 09:20

			Analysis		Date Prepared /			
Method	Bottle ID	Run	Batch	Prep Batch	Analyzed	Dil	Lab	Analyst
P:3510C	480-89467-B-18-A		480-273999	480-273586	11/06/2015 12:33	20	TAL BUF	CPH
A:8270D	480-89467-B-18-A		480-273999	480-273586	11/10/2015 :20:17	20	TAL BUF	DMR

TestAmerica Buffalo A = Analytical Method P = Prep Method
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Job Number: 480-89467-1

Client: U.S. Army Construction Engineering Resea

Laboratory Chronicle

Lab ID: 480-89467-19 Client ID: P-01-100814-1120

Sample Date/Time: 10/08/2014 11:20 Received Date/Time: 10/20/2015 09:20

Analysis Date Prepared / Method Bottle ID Batch Prep Batch Analyzed Analyst P:3510C 480-89467-B-19-A 480-273999 480-273586 11/06/2015 12:33 20 TAL BUF CPH A-8270D 480-89467-B-19-A 480-273999 480-273586 11/10/2015 20:46 TAL BUF DMR

Lab ID: 480-89467-20 Client ID: P-01-013015-0915

Sample Date/Time: 01/30/2015 09:15 Received Date/Time: 10/20/2015 09:20

Analysis Date Prepared / Method Bottle ID Run Batch Prep Batch Analyzed Dil Analyst Lab P:35100 480-89467-B-20-A 480-273999 480-273586 11/06/2015 12:33 TAL BUF CPH A:8270D 480-89467-B-20-A 480-273999 480-273586 11/10/2015 21:15 TAL BUF DMR 20 P:3510C 480-89467-B-20-A DL 480-274392 480-273586 11/06/2015 12:33 100 TAL BUF CPH A:8270D 480-89467-B-20-A DL 480-274392 480-273586 11/11/2015 14:45 100 TAL BUF DMR

Lab ID: 480-89467-21 Client ID: P-01-040115-1600

Sample Date/Time: 04/01/2015 16:00 Received Date/Time: 10/20/2015 09:20

Analysis Date Prepared / Batch Analyzed Method Bottle ID Run Prep Batch Dil Analyst Lab 11/05/2015 16:45 800 TAL BUF A:8021B 480-89467-B-21 480-273207 11/05/2015 16:45 800 TAL BUF JRL

Lab ID: 480-89467-22 Client ID: OS-01-101514-0910

Sample Date/Time: 10/15/2014 09:10 Received Date/Time: 10/20/2015 09:20

Analysis Date Prepared / Batch Analyzed Method Bottle ID Run Prep Batch Lab Analyst 480-89467-A-22-A P:3580A 480-273073 11/04/2015 13:45 480-273506 100 TAL BUF CAM A 8270D 480-89467-A-22-A 480-273506 480-273073 11/05/2015 18:21 TAL BUF CAS

Lab ID: 480-89467-23 Client ID: P-01-012215-0948

Sample Date/Time: 01/22/2015 09:48 Received Date/Time: 10/20/2015 09:20

Analysis Date Prepared / Method Bottle ID Batch Prep Batch Analyzed Analyst P:5030B 480-273207 11/05/2015 19:13 480-89467-B-23 800 TAL BUF JRL A:8021B 480-89467-B-23 480-273207 11/05/2015 19:13 TAL BUF

Lab ID: 480-89467-24 Client ID: WW-01-031315-1531

Sample Date/Time: 03/13/2015 15:31 Received Date/Time: 10/20/2015 09:20

Analysis Date Prepared / Batch Analyzed Method Bottle ID Run Prep Batch Dil Analyst Lab P.5030B 480-89467-B-24 480-273207 11/05/2015 19:44 200 TAL BUF JRL TAL BUF 480-89467-B-24 JRL A:8021B 480-273207 11/05/2015 19:44 200

TestAmerica Buffalo A = Analytical Method P = Prep Method

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Job Number: 480-89467-1

Client: U.S. Army Construction Engineering Resea

Laboratory Chronicle

Lab ID: MB

Client ID: N/A

Sample Date/Time: N/A

Received Date/Time N/A

Method	Bottle ID	Run	Analysis Batch	Prep Batch	Date Prepared / Analyzed	Dil	Lab	Analyst
P:3580A	MB 480-273073/1-A		480-273506	480-273073	11/04/2015 13:45	1	TAL BUF	CAM
A:8270D	MB 480-273073/1-A		480-273506	480-273073	11/05/2015 15:13	1	TAL BUF	CAS
P:3510C	MB 480-273586/1-A		480-273910	480-273586	11/06/2015 12:33	1	TAL BUF	CPH
A:8270D	MB 480-273586/1-A		480-273910	480-273586	11/09/2015 14:26	1	TAL BUF	DMR
P.5030B	MB 480-273207/3		480-273207		11/05/2015 08:28	1	TAL BUF	JRL
A:8021B	MB 480-273207/3		480-273207		11/05/2015 08:28	1	TAL BUF	JRL

Lab ID: LCS

Client ID: N/A

Sample Date/Time: N/A

Received Date/Time: N/A

Method	Bottle ID	Run	Analysis Batch	Prep Batch	Date Prepared / Analyzed	Dil	Lab	Analyst
P:3580A	LCS 480-273073/2-A		480-273506	480-273073	11/04/2015 13:45	1	TAL BUF	CAM
A:8270D	LCS 480-273073/2-A		480-273506	480-273073	11/05/2015 15:40	1	TAL BUF	CAS
P:3510C	LCS 480-273586/2-A		480-273910	480-273586	11/06/2015 12:33	1	TAL BUF	CPH
A.8270D	LCS 480-273586/2-A		480-273910	480-273586	11/09/2015 14:56	1	TAL BUF	DMR
P.5030B	LCS 480-273207/4		480-273207		11/05/2015 09:00	1	TAL BUF	JRL
A:8021B	LCS 480-273207/4		480-273207		11/05/2015 09:00	1	TAL BUF	JRL

Lab ID: LCSD

Client ID; N/A

Sample Date/Time: N/A

Received Date/Time: N/A

Method	Bottle ID	Run	Analysis Batch	Prep Batch	Date Prepared / Analyzed	Dil	Lab	Analyst
P:3580A	LCSD		480-273506	480-273073	11/04/2015 13:45	1	TAL BUF	CAM
A:8270D	480-273073/3-A LCSD 480-273073/3-A		480-273506	480-273073	11/05/2015 16:07	1	TAL BUF	CAS
P:5030B	LCSD 480-273207/5		480-273207		11/05/2015 09:31	7	TAL BUF	JRL
A:8021B	LCSD 480-273207/5		480-273207		11/05/2015 09:31	1	TAL BUF	JRL

Lab References:

TAL BUF = TestAmerica Buffalo

TestAmerica Buffalo

A = Analytical Method

P = Prep Method

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REAGENT TRACEABILITY SUPMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

Spg No.:

12/02/15 11/02/15 Market, Lot 701108/8 Malyte Malyte Malyte Concession Malyte Concession Malyte Concession Malyte Concession Control Concession Control		rep	Dalutant	Final		Volume		
12/02/15 12/02/15 Restrict Lot 5010888 1 (2010) 20016 200 to 16 Emblicance 2010 2010 2010 2010 2010 2010 2010 20	11-	ace	Daed	Volume	Reagent ID	Added	Analyte	Concentration
## Elly/Desirence Control Contro			ethanol, Lot	Jul T	8021 ALT 200 00016	200 ul		40 ng/mr
12/02/15 Rearre k, Lot A0110888		Ď,	50000000000000000000000000000000000000				Ethylbenzene	40 ng/mL
12/02/15 RestPek, Lot A0110888 (Farthhased Reagent) Tolterne 2							m, p-Xylene	30 ug/mL
13/02/15							o-Xylene Toluche	40 ug/mL
SPA13/15 Water, Lot na	17.15		Rester, Lot A0110888		(Futchased Reads	ents	Benzene	200 ug/mL
09/13/15 09/18/15 water, Lot na 100 mL 0021_STR200_00060 10 uL 13_6_TrimerbyLennene							Ethylbenzene	200 ug/mL
99/13/15 08/18/15 water Lot na 100 mL 8021_STRZ00_00060							m,p-Xylene	400 ug/mL
09/13/15 08/18/15 water, Lot na 100 mL 8021_STX200_00660 10 uL 1.2 d=TrimethyLearene 1.2 d=TrimethyLearene 1.3 d=TrimethyLearene 1.3 d=TrimethyLearene 2.4 TrimethyLearene 3.4 TrimethyLearene 3.4 TrimethyLearene 4.5 d=TrimethyLearene 4.5 d=TrimethyLearene 5.5 d=TrimethyLearene 5.6 d=TrimethyLearene 5.7 TrimethyLearene 5.7 TrimethyL	_			1			o-Xylene	200 ug/mL
199/13/15 08/18/15 08/18/15 09/13/15	\rightarrow							200 ug/mL
1.3,5.7.1mehylbensene	-	18/15 W		100 mL	8021 STX200 00060	10 ut		
O9/13/15 09/18/15 PST Nethempol, Lot had 18021_STY200_90000							1,3,5-Trimethylbenzene	0,02 ug/mL
September Sept	_						4-Isopropyltoluene	0,02 ug/mL
199/13/15 Ultra, Lot CX-2339 (Purchased Reagent) 109/13/15 D8/13/15 Lot na 100 mL 8021_ETK200_00000 109/13/15 D8/13/15 PRT Wethandly Lotten							Benzene	0.02 ug/mL
O9/13/15 O8/18/15 DWAY	_						hthylbenzene	0,02 ug/mL
Methyl tetrhatyl ether Methyl ether							1sopcopy benzene	0,02 ug/mL
Particular Par							f-kntol	0.02 ng/ml.
National							1	0.00 ag/ml
109/13/15 Ultra, Lot CM-2339 (Parchased Reagent) 1.2.4 Trimethylbenzene							M-Pronyl hengene	
09/13/15 Ultra, Lot CM-2339 (Purchased Reagent) 1.2.4-Tilmethylbenzene 0 Toluene 0 1.2.4-Tilmethylbenzene 0 1.3.5-Tilmethylbenzene 0 1.3.5-Tilmeth							Nanhthalane	0.02 nor/ml.
O9/13/15							6-XvIene	0.02 ng/mt
O9/13/15 Ultra, Lot CM-2339 (Purchased Reagent) 1.3, 4 Trimethylbenzene O9/13/15 O8/18/15 D8T Methanol, Lot ha 1.90 mL 8021 sTR200_00060 Section 12, 4 Trimethylbenzene O-Xylene	_						San-Virgh Denyene	G.02 Mer/mL
Toluene 12.4 Titlethylbentene 12.5 Titlethylbentene 13.5 Titlethylbent	_						rett-Tuty/henzene	0.02 ng/ml.
09/13/15	_						Toluene	0.00 Novemb
1.3,5-Trimethylbenzene	3/15		Ultra. Lot CM-2339		(Purchased Reads	ent)	1.2.4-Trimethylbengene	200 ug/mL
4-1500 bopyleduene Benzene Ben					1		1,3,5-TrimethVlbenzene	200 ug/mL
Benzene Benz	_						4-Isomropvlteluene	200 ug/mL
Ethylbenzene	_						Benzene	200 ug/mL
Isogropy/lbenzene Machyl tett-buryl ether Machyl tetter Machyl	_						Ethylbenzene	200 acymL
The part of the							Isopromylbensene	200 ug/mL
Methyl tert-bucyl ether Nethyl tert-bucyl ether Nethyl tert-bucyl ether Nethyl benzene Nethyl benz							m, p-Xy Lene	400 ng/mL
Percentage								200 ug/mL
Neghtbelene Neghtbelene							n-Butylbenzene	200 ug/mL
Naghthalene O=Nylanene O=							N-Bropylbenzene	200 ng/mL
09/13/15 08/18/15 PMT Methanol, Lot ha 100 mL 8021_STX200_00000 30 ul. 1.2.4 -Trumethylbenzene Toluene sec-Burylbenzene Toluene Terrimethylbenzene 1.3.5 -Trimethylbenzene Bengene Bengene Bengene Ethylbenzene Eknylbenzene Eknylbenzene							Naphthalene	200 ug/mL
Sec-Burylbenzene Sec-Burylbenzene Toltene Tolten	_						o-Xylene	200 ng/mL
Telt-Butylbenzene	_						sec-Burylbengene	200 ug/mL
Toltene O9/13/15 PVT Methanol, Lot ha 100 mL 8021_STX200_00000 30 ul 1.2.4=Trimethylbensene 1.3.5=Trimethylbensene 1.3.5=Trimethylbensene 1.3.0=Trimethylbensene Encylpensene Encylpe	_						rert-Burylbenzene	200 ng/mL
09/13/15 08/18/15 PMT Methanol, Lot na 100 mL 8021_STR200_00060 30 ul. 1.2 4-Trimethylbenrene 1.35_CTrimethylbenrene 4_LSOPTOPYLFOLMENE Enthylbenrene Enthylbenrene Enthylbenrene Enthylbenrene Enthylbenrene							Toluene	200 ng/mE
1.3,5-Trimethylbensene 4-1sopropylyoluene Eenstene Eenstene Enstene		18/15 P	Mr Merhanol, Lor na	100 mL	8021 STK200 00060	30 NT		0.06 ug/mL
Luene							1,3,5-Trimethylbenzene	1m/m 90.00
900	_						4-Isopropyltoluene	0,06 ug/mL
ene							Benzene	0.06 ng/mL
							Ethylbenzene	0,06 ug/mL
							Isopropylbensene	0.06 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

				Washington	Parent Reagent			
Reagent ID	SMp Date	Prep	Dilutant Used	Final	Reagent ID	Volume Added	Analyte	Concentration
							m.p-Xylene	0.12 ug/mL
							Methyl tert-butyl ether	0.05 40/mb
								0.06 ug/mL
							N-Propylbengene	0.06 ng/mL
							Naphthalene	0,06 uq/mL
							o-Xylene	0.06 ng/mL
							sec-Butylbenzene	0.05 wg/mL
							tert-Burylbenzene	0.05 ug/mL
							Toluene	0,0% ug/mL
,8021 STK200 00060	09/13/15		Ultra, Lot CM-2339		(Purchased Reagent)	at }	1, 2, 4-Trimethylbenzene	200 ug/mL
							1, 3, 5-Trimethylbenzene	200 ng/mL
							4-Isopropyltoluene	200 ng/mr
							Bensene	200 ug/mL
							Ethylbenzene	200 ng/mL
							Isopropylbenzene	200 ug/mL
							m, p-Xylene	400 ng/mL
							Methyl tent-buryl ether	200 ug/mL
							n-Butylbensene	200 ug/mL
							W-Bropylbenzene	Z00 ug/mL
							Naphthalene	200 ug/mL
							o-Xvlene	200 na/mL
							sec-Eurylbenzene	200 ug/mL
							tert-Butylbenzene	200 ng/mL
							Toluene	ZDO wg/mL
9001 642000 00063	21/00/01		Titre for Charge		Transfer beardward	1441	000000000000000000000000000000000000000	Sold worker
2000	54 140 194		Constant and Appendix		Topogramman	401	Deliberal hands	Tary Social
							Bunyloangene	TIM / 62 067
							m, p-Xylene	400 mg/mr
							o-Xylene	
							Toluene	200 ng/mL
8021 Surr150 00055	10/02/15	09/03/15	-	10 PL 8	mL 8021 SURRSONO 00067	Th OOK	4-Bromofluorobenzene	150 ng/mL
			00000033434				a.a.a-Trofilnoropoluene	150 ug/mL
.8021 SURRSGOO 00067	10/02/15		ULTRA, Lot CM-2340		(Furchased Reagent)	at)	4-Bromcilnorobenzene	5000 ng/mL
	A CONTRACTOR		E 22 / 10 2 / 10 2				a, a, a-Trifluorotoluene	5000 ng/mF
8021_Surr150_00057	12/02/15	11/02/13	Methanol, Lot	10 aL 8021	021_SURR5000_00069	300 nT	4-Bromofluorobenzene	150 ng/mL
The state of the state of			r v room on one				a, a, a-Trifluorotoluene	150 ng/mL
.8021 SURR5000 00069	12/05/15		ULTRA, Lot CM-2340		(Furchased Reagent)	at)	4-Bromofluorobenzene	5000 ng/mp
							a, a, a-Trifluciotoluene	2000 ng/mr
MB INTSTD STK 00014	10/01/16		Rester, Lot A0112833		(Purchased Reagent	ut)	1,4-bichlorobenzene-d4	2000 ug/mL
							Acenaphthene-d10	2000 ag/mL
							Chrysene-d12	2000 ug/mL
							Naphthalene-d8	2000 ng/mt.
							Perylene-d12	2000 ug/mL
							Phenanthrene-dl0	2000 ng/mF

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REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

SDS No.:

Recognition District
93/22/13 199/22/43 Merbylens Calcalde, Lot 10 18 14.21 199 00001. 13.5 4 7 12 12 10 10 10 10 10 10 10 10 10 10 10 10 10
1.2.4,5-Tetrachlorobenzene 1.3.4-Terachlorobenzene 1.4.5-Duphenylhydrazine 1.5-Duphenylhydrazine 1.5-Duphenylhydrazine 1.5-Duphenylhydrazine 1.4-Duchenzene 1.4-Duchenzene 1.4-Duchenzene 1.4-Duchenzene 1.4-Duchenzene 1.4-Duchenzene 1.4-Duchenzene 1.5-Auterbenzene

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

					Washington	Parent Reagent		
Read	Reapent ID	EMp	Prep	Dilutant	Final	Reagent ID Added	ume ed Analyte	Concentration
							Bis(3-chlocoethoxy) methane	0.25 ug/mt
							Bis(2-chloroethyl)ether	0,25 ng/mL
							Bis(2-ethylhemyl) phthalate	0,25 ug/mL
							Butyl benzyl phthalate	0.25 ng/mr
							Carbazole	0,25 ug/mL
							Chrysene	0.25 ng/mL
							Di-n-butyl phthalate	0.25 Ng/mL
							Di-n-octyl phthalate	0.25 ug/mL
							Dibenz a, h anthracene	0.25 ug/mt.
							Dibenzofuran	0.25 ug/mL
							Diethyl phthalate	0.25 ug/mL
							Dimethyl phthalate	0,35 ug/mL
							Diphenylamine	0.4275 ug/mL
							Fluoranthene	0.25 ng/mL
							Fluorene	0.25 ug/mL
							Hexachlorobenzene	0.25 ug/mL
							Hexachlorobutadiene	0.25 ug/mb
							Hexachlorocyclopentadiene	0.25 ug/mt
							Mexachloroethane	0.25 ug/mL
							Hexadedane	0,25 ug/mL
							Indeno[1, 2, 3-cd]pyrene	0.25 ug/mr
							Isophorone	0.25 ug/mL
							n-Decama	0.25 ng/mt
							N-Nitrosodi-n-propylamine	0.25 Mg/mL
							N-Nitrosodimethylamine	0.25 ug/mL
							N-Nitrosodiphenylamine	0.5 ug/mt
							n-Octadecane	0,25 ug/mL
							Naphthalene	0.25 ug/mL
							Nitrobensene	0,25 ng/mL
							Pentachlorophenol	0.5 ug/mL
							Phenanthrene	0.25 ng/mL
							Phenol	0.25 ug/mL
							Pyrene	0.25 ug/mL
							Eyridine	0.25 ug/mL
							Benzote acid	0.25 ug/mt
							Indene	0.25 ug/mL
							Atrazine	0.25 ug/mL
							Benzaldehyde	0.25 ug/mr
							Captolactam	0,25 ug/mL
							3,3'-Dichlorobenziding	0.25 ug/mL
							Benzidine	0.25 Mg/mL
							2,4,6-Tribromophenol	0.25 ug/mL
							2-Fluorobiphenyl	0,25 ug/mL
							2-Fluorophenol	0.25 ug/mL
							Nitrobenzene-d5 (Surr)	0.25 ug/mL
		Ī					p-Terphenyl-dl4 (Surr)	0,25 Mg/mL
							Phenol-d5	0.25 ug/mL

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Lab Name: TestAmerica Buffalo Job No.: 480-89467-1

REAGENT TRACEABILITY SUMMARY

GD No.: 480-89467-1
5
Butfalo
TestAmerica
Lab Name:
Lab Name: TestA

Respert ID Date Date Date Tind Volume	ume Reagent ID	Volume		
			Analyte	Concentration
			Bis(2-chlocoethoxy)methane	200 uq/mL
			Bis (3-chloroethy]) ether	200 ud/mL
			Rie 19-attvihaovil ubthalate	200 novm1.
			Burnel herewil where or	300 ac/m1
			Parkagala	200 ug/mi
			Carte 2000	Service Contraction
			Curysene	TO DO TO
			Di-n-butyl phthalate	200 Ng/mL
			Di-n-octyl phthalate	200 ug/mL
			Dibenz(a, h) anthracene	200 ug/mt.
			Dibenzofuran	200 ug/mL
			Diethyl phthalate	250 ug/mL
			Dimethyl phthalate	200 ug/mt
			Diphenylamine	342 ug/mL
			Fluoranthene	200 ng/mL
			Fluorene	200 ug/mL
			Hexachlorobenzene	200 ng/mL
			Hexachlonobutadiene	200 ug/mL
			Hexachlorocvclopentadiene	200 ug/mt
			Hexachloroethane	200 uc/mL
			Hexadecane	200 uq/mL
			Indenoil, 2, 3-collourene	200 na/mt
			TROUBLESS	200 un/mL
			P-Decade	900 ser/ort
			N-N: Fromcodi-b-b-bronylamina	200 wer/mt.
			M-Metrosodimethylamine	200 not/ml
			Marie and collection of the collection	400 waynt
			TO CHANGE OUT DIRECT LOUISING	Tayon ooc
			M-coladecade	THI/BR 002
			Mannuatene	10/m ng/m
			National Section	TH/ HR 002
			Pentagnilorophenol	400 ug/m
			phone I	Taylor Coc
			Pheno	290 ug/mr
			Surviva di ma	200 ma/ml
	COUNTY ARE STREET AN	1000	-	100 con 000
	Da ateria a money	-		Jay 2000
	MR LISTI SWE DODGE	Toon ut	-	200 no/ml.
			_	200 novm.
			Cantolactan	200 ug/mL
	ME LISS STK DDGDZ	1000 aL	J. 3.3'-Dichlorobenzidine	200 ng/mL
			Benzidine	200 wg/mL
	MB SHES STR DOOGS	400 nL	-	200 ud/mL
	The state of the s		_	200 ng/mt
			2-Fluoronbenol	200 na/ml.
			Nitrobenzene-d5 (Surr)	250 ug/mL
				200 wa/mt
			1	200 ug/mL
WB LISI STR G0023 12/31/16 Restex, Lot 80111934	(Burchased Reagent)	agent)	I,1"-Biphenyl	1000 ng/mL

REAGENT TRACEABILITY SUMMARY

Jop No.: 480-89467-1 Lab Name: TestAmerica Buffalo

Added 1, 2, 4, 5-Tetrachlorobenzene 1, 2-Diollorobenzene 1, 2-Diollorobenzene 1, 3-Diollorobenzene 1, 3-Diollorobenzene 1, 4-Diollorobenzene 1, 4-Diolorobenzene					Total Comment	Eatent Reagent		
12.24.55.5Tettacthlorobenzene	Reagent ID	EMp	Prep	Dilutant	Final	a		Concentration
1.2.4=Titchiorobenzene							1.2.4.5-Tetrachlorobenzene	3000 ng/ml
1.2-Dichlorobenzene							1,2,4-Trichlorobenzene	1000 ud/mI
1,2-Diphenyihydrafine. 1000							1,2-Dichlorobengene	IOOO nd/mI
1, 3 - Dichlorobenzene							1.2-Diphenvillydragine	1000 ug/mi
1,3-nintrobensene							1, 3-Dichlorobenzene	1000 ug/mI
1.4 - Dichlorobenses 1000 1.4 - Dichlorobenses 1000 1.4 - Dichlorobenses 1000 2.2 - Osybis[1-chloropense] 1000 2.3 - Osybis[1-chloropense] 1000 2.4 - Elichloropheno] 1000 2.4 - Elichloropheno] 1000 2.4 - Dintloropheno] 1000 2.4 - Dintloropheno] 1000 2.4 - Dintloropheno] 1000 2.5 - Dintloropheno] 1000 2.5 - Dintloropheno] 1000 2.5 - Dintloropheno] 1000 2.5 - Dintloropheno] 1000 2.5 - Dintloropheno] 1000 2.5 - Dintloropheno] 1000 2.5 - Dintloropheno] 1000 2.5 - Dintloropheno] 1000 2.5 - Dintloropheno] 1000 3.5 - Dintloropheno] 1000 4.5 - Dintloropheno] 1000 5.5 - Dintloropheno] 1000 6.5 - Dintloropheno] 1000 8.5 - Dintloropheno] 1000 9.5 - Dintlo							1,3-Dinitrobenzene	1000 ng/m
1,4 -0; oxane 1,000							1,4-Dichlorobenzene	1000 %g/mI
1-Wetbylnaphthalease 1000 2.7 s. f. c. Tetrachiorophonol 1000 2.7 s. f. f. f. c. f.							1,4-Dickane	1000 ug/mI
2.2**ogsbis[1-chictopropane] 1000 2.4.5-TTLCALexophenol 1000 2.4.6-TTLCALexophenol 1000 2.4.6-TTLCALexophenol 1000 2.4-Dimitrophenol 1000 2.4-Dimitrophenol 1000 2.6-Dimitrophenol 1000 2.6-Dimitrophenol 1000 2.6-Dimitrophenol 1000 2.8-Methylhoshenol 1000 2.8-Methylhoshenol 1000 2.8-Methylhoshenol 1000 2.8-Methylhoshenol 1000 2.8-Methylhoshenol 1000 3.8-Mitrophenol							1-Methylnaphthalene	
2,3,4,6-Tetachiorophenol 1000 2,4,8-Tutchiorophenol 1000 2,4-Tutchiorophenol 1000 2,6-Tutchiorophenol 1000 2-Methylphenol 1000 2-Methylphenol 1000 2-Methylphenol 1000 2-Methylphenol 1000 2-Methylphenol 1000 3-Mitroaniline 1000 4-Chiorophenol 1000 4-Chiorophenol 1000 4-Chiorophenol 1000 4-Chiorophenol 1000 4-Chiorophenol 1000 4-Chiorophenol 1000 4-Chiorophenol 1000 4-Chiorophenol 1000 4-Chiorophenol 1000 6-Chiorophenol 1000 6-Chiorophenol 1000 6-Chiorophenol 1000 6-Chiorophenol 1000 7-Cenaphthine 1000 6-Chiorophenol 1000 6-Chioroph							2,2"-oxybis[1-chloropropane	1000
2.4.5-Titchlorophenol 2.4-Differthorophenol 2.4-Differthorophenol 2.4-Differthorophenol 2.4-Differthorophenol 2.4-Differtophenol 2.5-Dichlorophenol 2.6-Dichlorophenol 2.6-Dichlorophenol 2.6-Dichlorophenol 2.6-Dichlorophenol 2.4-Differthorophthalene 2.000 2.4-Differthorophthalene 2.000 2.4-Differtophenol 2.4-Differthorophthalene 2.000 2.4-Differthorophthalene 2.000 2.4-Differthorophthalene 2.000 2.4-Differthorophenol 2.4-Differthorophenol 2.4-Differthorophenol 3.000 3.4-Differthorophenol 3.000 3.000 3.4-Differthorophenol 3.000 3.00							2,3,4,6-Tetrachlorcohenol	1000
2,4,6-Tixtchorophenol 1000 2,4-Dinitrophenol 1000 2,4-Dinitrophenol 1000 2,4-Dinitrophenol 1000 2,6-Dinitrophenol 1000 2,6-Dividiorophenol 1000 2-Althorophenol 1000 2-Mitrophenol 1000 2-Mitrophenol 1000 2-Mitrophenol 1000 3-Mitrophenol 1000 3-Chiorophenol 1000 3-Chiorophenol 1000 3-Chiorophenol 1000 3-Chiorophenol 1000 3-Chiorophenol 1000 3-Mitrophenol							2, 4, 5-Trichlorophenol	1000 ud/mt
2.4 -01 chlorophenol 1000 2.4 -01 met yellphenol 2.000 2.4 -01 mit togebenol 2.000 2.5 -01 chlorophenol 2.000 2.6 -01 chlorophenol 1000 2.6 -01 chlorophenol 1000 2.4 -01 togebenol 1000 3.4 -01 togebenol 1000 4.6 -01 togebenol 1000 4.6 -01 togebenol 1000 4.6 -01 togebenol 1000 4.7 -01 togebenol 1000 4.8 -01 togebenol 1000 4.8 -01 togebenol 1000 4.8 -01 togebenol 1000 4.8 -01 togebenol 1000 4.8 -01 togebenol 1000 6.00							2,4,8-Trichlorophenol	1000 ug/mI
2,4-Dimethylphenol 2000 2,4-Dimethylphenol 2000 2,6-Dimitrocoluene 2000 2,6-Dimitrocoluene 2000 2,6-Dimitrocoluene 1000 2-Chlorophenol 1000 2-Methylphenol 1000 2-Methylphenol 1000 2-Methylphenol 1000 2-Methylphenol 1000 3-Nitrochline 1000 3-Nitrochline 1000 3-Nitrochline 1000 3-Nitrochline 1000 3-Nitrochline 1000 3-Chlorophenyl phenyl ether 1000 3-Chlorophenyl phenyl ether 1000 3-Chlorophenol 1000 3-Chlorophenol 1000 3-Nitrochline 1000 3-Nitrochl							2,4-Dichlorophenol	1000 ug/mI
2.4 **Dintroceluene 2000 2.6 **Dintroceluene 1000 2.6 **Dintroceluene 1000 2.6 **Dintroceluene 1000 2.6 **Dintroceluene 1000 2.4 **Chlorophenol 2000 2.4 **Etylphenol 1000 2.4 **Etylphenol 1000 2.4 **Irroaniline 1000 3.4 **Irroaniline 1000 3.5 **Chlorophenyl phenyl ether 1000 4.5 **Chlorophenyl phenyl ether 1000 4.5 **Chlorophenyl phenyl ether 1000 4.5 **Chlorophenol 1000 4.5 **Chlorophenol 1000 4.5 **Chlorophenol 1000 4.5 **Chlorophenol 1000 5.5 **Chlorophenol 1000 6.5 **Chlorophen							2,4-Dimethyiphenol	1000 ug/mI
2.6-Dichlocophenol 2000 2.6-Dichlocophenol 3000 2-Chlocophenol 3000 2-Chlocophenol 3000 2-Methylphenol 3000 2-Methylphenol 3000 2-Methylphenol 3000 2-Mitrophenol 3000 3-Nitrophenol 3000 4-Erocophenol 3000 4-Erocophenol 3000 4-Chlocomiline 3000 4-Chlocomiline 3000 4-Chlocomiline 3000 4-Chlocomiline 3000 4-Chlocomiline 3000 6-Chlocomiline 3000 6-							2.4-Dinitrophenol	2000 ng/mI
2,6-Dichlorophenol 3000 2-6-Dinitrocoluene 1000 2-Chlorophenol 1000 2-Methylphenol 1000 2-Mitrophenol 1000 2-Mitrophenol 1000 2-Mitrophenol 1000 3-Mitrophenol 1000 4-6-Dinitro-2-methylphenol 1000 4-Chlorophenyl phenyl ether 1000 4-Chlorophenyl phenyl ether 1000 4-Chlorophenol 1000 4-Methylphenol 1000 4-Methylphenol 1000 4-Methylphenol 1000 4-Mitrophenol 1000 6-Mitrophenol 1000 6-Mitrophenol 1000 6-Mitrophenol 1000 Mithine 1000 Mithine 1000 Benzo[a] Hiberylene 1000 Benzo[a] Hiberylene 1000 Benzo[a] Hiberylene 1000 Benzo[b] Hiberylene 1000 Benzo[b] Hiberylene 1000 Benzo[b] Hiberylene 1000 Benzo[a] Alloromethène 1000 Benzo[a] Alloromethène 1000 Benzo[b] Hiberylene 1000							2,4-Dimitrotoluene	1000 ug/ml
2.6 Dinit tockoluene 1000 2-Moltocoppithalene 1000 2-Moltocoppithalene 1000 2-Moltocoppithalene 1000 2-Moltocoppithalene 1000 2-Moltocoppithalene 1000 2-Mitrophenol 1000 3-Mitrophenol 1000 3-Mitrocope 100							2,6-Dichlocophenol	1000 ug/m1
2-Chlocopaphthalene 1000 2-Methylphenol 1000 2-Methylphenol 1000 2-Methylphenol 1000 2-Methylphenol 1000 2-Methylphenol 1000 2-Mitcoanline 1000 3-Mitcoanline 1000 4-Chloco-3-methylphenol 1000 4-Chlocophenyl phenyl ether 1000 4-Chlocophenyl phenyl ether 1000 4-Chlocophenyl phenyl ether 1000 4-Methylphenol 1000 4-Mitcoanline 1000 4-Mitcoanline 1000 6-Nitcoaphthylene 1000 6-Nitcoaphthylene 1000 Methylphenol 1000 Methylphenol 1000 Methylphenol 1000 Benzo[a] anthracene 1000 Benzo[a] anthracene 1000 Benzo[a] alperylene 1000 Benzo[b] [Allocanthene 1000 Benzo[a] alperylene 1000 Benzo[a] Allocanthene 1000							2,6-Dinitrotoluene	1000 ug/m[
2-Shittpaphthalene 1000 2-Mettylinghthalene 1000 2-Mettylinghthalene 1000 2-Mitroghthalene 1000 3-Mitroghthalene 1000 4-Foroghthaly phenyl ether 1000 4-Chiocomiline 1000 4-Chiocomiline 1000 4-Chiocomiline 1000 4-Mitroghthan 1000 4-Mitroghthan 1000 4-Mitroghthan 1000 4-Mitroghthan 1000 Amitroghthan 1000 Benzo(allyrene 1000 Benzo(allyrene 1000 Benzo(allyrene 1000 Benzo(allyrene 1000 Benzo(allyrene 1000 Benzo(allyrene 1000 Benzo(allyrene 1000 Benzo(allyrene 1000 Benzo(allyrene 1000 Benzo(allyrene 1000 Benzo(allyrene 1000 Benzo(allyrene 1000 Benzo(allyrene 1000 Benzo(allyrene 1000) Benzo(allyrene 1000) Benzo(allyrene 1000) Benzo(allyrene 1000)							2-Chloronaphthalene	1000 ug/m
2-WethyInaphthalene 1000 2-Nitrophenol 2-Nitrophenol 1000 3-Nitrophenol 1000 3-Nitrophenol 1000 3-Nitrophenol 1000 3-Nitrophenol 1000 4-EromophenyI phenyl ether 1000 4-ChlorophenyI phenyl ether 1000 4-Chlorophenol 1000 4-Nitrophenol 1000 4-Nitrophenol 1000 4-Nitrophenol 1000 4-Nitrophenol 1000 Aniline 1000 Aniline 1000 Aniline 1000 Anthedene 1000 Benzo(a) Anthedene 1000 Benzo(b) Liveranthene 1000							2-Chlorophenol	1000 ug/mI
2-Methylphenol 2000 2-Nitroghenol 2000 3-Nitroghenol 2000 4-Chinto-2-methylphenol 3000 4-Chinto-2-methylphenol 3000 4-Chinto-3-methylphenol 3000 4-Chinto-2-methylphenol 3000 4-Chinto-2-methylphenol 3000 4-Chinto-2-methylphenol 3000 4-Nitroghenol 2000 4-Nitroghenol 3000 4-Nitroghenol 3000 4-Nitroghenol 3000 Antithen 3000 Antithen 3000 Antithen 3000 Antithen 3000 Antithen 3000 Benzo[a]pyrene 3000 Benzo[a]pyrene 3000 Benzo[a]pyrene 3000 Benzo[a]choranchene 3000 Benzo[a]pyrene 3000 Benzo[b]fluoranchene 3000 Benzo[c]fliorethosy]nethane 3000 Bis[2-chioroethyl]ether 3000							2-Methylnaphthalene	1000 uq/mI
2-Nitrogalilae 2-Nitrogalilae 3-Nitrogalilae 3-Nitrogalilae 4-6-Dinitro-2-methylphenol 4-6-Dinitro-2-methylphenol 4-6-Dinitro-2-methylphenol 4-6-Dinitro-3-methylphenol 4-6-Dinitro-3-methylphenol 4-6-Dinitro-3-methylphenol 4-Nitrogalilae 4-Nitrogalilae 4-Nitrogalilae 4-Nitrogalilae 5-000 4-Nitrogalilae 5-000 6-Methylphenol 7-000							3-MathyInhenol	1500 wa/m
2-Nitrophenol							2-Nithoghiline	1000 ма/м
3-Niroganiline 1000 4.6-Dinitro-2-methylphenol 2000 4-Choroaniine 1000 4-Choroaniine 1000 4-Niroganiine 1000 5-Diamete 1000 5-Dia							d-N-r-orbana	1000 ve/m[
4.6.Dintro-2-methylphenol 4.Eroquephenyl phenyl 4-Chloroghenyl phenyl ether 4-Chloroghenyl phenyl ether 4-Chloroghenyl phenyl ether 4-Chloroghenyl phenyl ether 4-Mitroghenol 5-Chraphthene 6-Mitroghenol 6-Mitroghe							3-M-troops land	Jackson Cool
4. Chloro-3-nethylphenol 4. Chloro-3-nethylphenol 4. Chloromiline 4. Chloromiline 4. Althoromiline 4. Althoromiline 5. Altrophenol 5. Altrophenol 6. Altrophenol 7. Acenaphthlene 7. Acenaphthlene 7. Acenaphthlene 7. Acenaphthlene 7. Acenaphthlene 7. Acenaphthlene 7. Acenaphthlene 7. Acenaphthlene 7. Acenaphthlene 7. Acenaphthlene 7. Acenaphthlene 7. Acenaphthlene 7. Acenaphthlene 8. Acenaphthlen							A STATE CONTEST OF THE PARTY OF	Im/ the cook
4-broopleay; pinery 4-Chlocoaniline 4-Chlocoaniline 4-Chlocoaniline 4-Chlocoaniline 4-Nircoaniline 4-Nircoaniline 5-Nircoaniline Acetaphthane Acetaphthane Acetaphthane Acetaphthane Acetaphthylene Acetaphthylene Acetaphthylene Acetaphthylene Benso(alanthacene Benso(alanthacene) Benso(alanthacene) Benso(alanthacene) Benso(alanthacene) Benso(alanthacene) Benso(alanthacene) Benso(alanthacene) Benso(alanthacene) Benso(alanthacene) Benso(alanthacene) Benso(alanthacene) Benso(alanthacene) Benso(alanthacene) Benso(alanthacene)							4,6-DINITERS-2-methylphenol	THINGS OF THE
4-Chloropiantine 4-Chloropiantine 4-Methylphanol 4-Methylphanol 4-Methylphanol 4-Methylphanol Acetaphihane Acetaphihane Acetaphihane Acetaphihane Acetaphihane Acetaphihane Acetaphihane Acetaphihane Acetaphihane Acetaphihane Acetaphihane Acetaphihane Benoclalathiscene							4-bromophenyi phenyi ether	TOOG III/III
4-Chloropaniine 4-Chloropaniine 4-Mathylphenol 4-Matrophenol 4-Natrophenol 4-Natrophenol Acenaphthene Acenaphthene Acenaphthylene Acenaphthylene Anthracene Anthracene Anthracene Benoolalanthracene Benoolalynene Benoolstwichene							4-Curoro-3-methylphenot	TOOG MG/MI
4 Tethylphenol 4 Thethylphenol 5 Thethylphenol 6 Thethylphenol 6 Thethylphenol 6 Thethylphenol 7 Thethylphenol 7 Thethylphenol 7 Thethylphenol 7 Thethylphenol 7 Thethylphenol 7 Thethylphenol 7 Thethylphenol 7 Thethylphenol 7 Thethylphenol 7 Thethylphenol 7 Thethylphenol 7 Thethylphenol 8 Thethylphenol							Sec. and	1
4-Watcohnine 4-Watcohnine 4-Watcohnine 4-Watcohnine Acenaphthene Acenaphthylene Acstophenone Aniline Anthrace Anthrace Anthrace Anthrace Benzo(alanthrace Benzo(alanthrace Benzo(blitwenthene Benzo(blitwenthene) Benzo(blitwenthene) Benzo(blitwenthene)							birens	1
4-Nircophenon Acenaphthene Acenaphthylene Acetophenone Anilne Anilne Anthree Asobensene Benso(alanthacene Benso(blfucenthène							4-N-troops the	1000 mm/mi
Acetaphihase Acetaphihase Acetaphihase Acetaphihase Anilus Anthracene Anothracene Asobenizede Benzolajanhihacene Benzolajanhihacene Benzolajhijaprylane Benzolajianihase Benzolajianihase Benzolajianihase Benzolajianihase Benzolajianihase Benzolajianihase Benzolajianihase Benzolajianihase							G-N- Frontenor	Tary and and and and and and and and and and
Acenaphthylene Acetophenone Anlihone Anthracee Asobeneene Benso(alanthracee Benso(alanthracee Benso(alpyrene Benso(alpyrene Benso(alpyrene Benso(blituorathene Benso(klituorathene Benso(klituorathene Benso(klituorathene Bensy(alcohol Bis(2-chloroethoxy)methane							Acengelithene	\$000 ve/m!
Actobhenone Aniline Anthracene Asobensene Benso(alanthracene Benso(alanthracene Benso(alanthracene Benso(alanthracene Benso(blitucrenthene Benso(blitucrenthene Benso(blitucrenthene Benso(blitucrenthene Benso(blitucrenthene Benso(blitucrenthene Benso(blitucrenthene Benso(blitucrenthene							Acenaphthylene	1000 na/m
Aniline Ancherone Ascherone Benso[a]anthracene Benso[a]anthracene Benso[a]pyrene Benso[b]filucianthène Benso[k]filucianthène Benso[k]filucianthène Benso[k]filucianthène Bensyl alcohol Bis[2-chloroethoxy]methane Bis[2-chloroethy]lèthèr							Acetophenone	Im/pu 0001
Anthracene Ascellation Benzo(alpyrene Benzo(alpyrene Benzo(alpyrene Benzo(alpyrene Benzo(alpyrene Benzo(alpyrene Benzo(alpyrene Benzo(alpyrene) Benzo(alpyrene) Benzy(alcohol Benzy(alcohol Bels(2-chloroethory)methane							Antline	1000 uq/m
Asobemmen Benzo(alanthacene Benzo(alanthacene Benzo(alpyrene Benzo(blilwerenthene Benzo(blilwerenthene Benzo(blilwerenthene Benzy(alcohol Benzy(alcohol Bis(2-chloroethory)methane							Anthradene	1000 ug/mI
Benzo[a]pyrene Benzo[a]pyrene Benzo[b]tilperylene Benzo[c,h,i]perylene Benzo[x,l]tilontanthene Benzyl, alchhol Bis[2-chloroethowy]methane Bis[2-chloroethy])ether							Asobengene	1000 ng/m
Benzo(alpyrene Benzo(b) filtorantene Benzo(c), h, ilperylene Benzo(k) filtorantene Benzyi, alcohol Bis(2-chloroethoxy)methane Bis(2-chloroethoxy)methane							Benzo[a]anthracene	Im/pw 0001
Benzo[D]fiuccanthene Benzo[ch.liptoranthene Benzyl alcohol Benzyl alcohol Bis[2-chloroethoxy]methane Bis[2-chloroethoxy]methane							Benzo[a]pyrene	1000 ug/mI
Benzofg.h.ilperylene Benzofklfinoranthene Benzofklfinoranthene Benzofklfinoranthene Bis(2-chloroethoxy)methane Bis(2-chloroethy)lether							Benzo[b]flucranthene	1000 ug/mt
Benzofk fluorathene Benzyl alcohol Bis(2-chloroethowy)methane Bis(2-chloroethyj)ether							Benzo[g,h,1]perylene	1000 ng/ml
Benzyi alcohol Els(2-chloroethony)methane Bis(2-chloroethy))ether							Benzo[k]fluoranthene	1000 ug/mI
Bis(2-chloroethowy)methane Bis(2-chloroethy1)ether							Benzyi alcohol	1000 ug/mt
Bis (2-chlorosthyl) ether							Bis (2-chloroethoxy) methans	1000 ug/mI
							Bis (2-chloroethyl) ether	1000 ng/m[
								100000000000000000000000000000000000000

REAGENT TRACEABILITY SUMMARY

Job No.: 480-89467-1 Lab Name: TestAmerica Buffalo

SDG No.:

				Toonsont	Farent Readent			
Reayent ID	EMP	Prep	Dilutant	Final	Reagent ID	Volume	Analyte	Concentration
						818(3	Bis(2-ethylhexyl) phthalate	3000 uq/mL
						Buryl		1000 ug/mL
						Carbazole	zole	T000 nd/mT
						Chrysene	ene	1000 ug/mL
						-u-TO	Di-n-butyl phthalate	1000 ug/mL
						Di-n-	Di-n-octyl phthalate	1000 ng/mL
						Diber	Dibenz (a. h) anthracene	1000 WG/mL
						Diben	Dibenzofuran	1000 ud/mL
						Dieth	Diethyl phthalate	
						Dimet	Dimethyl phthalate	
						Diphe	Diphenylamine	1710 ug/mL
						Fluor	Fluoranthene	1000 ud/mL
						Fluorene	епе	1000 ug/mL
						Hexac	Hexachlorobenzene	1000 ng/mL
						Hexac	Hexachlorobutadiene	1000 ng/mf
						Hexac	Hexachlorocyclopentadiene	1000 ng/mL
						Hexac	Hexachloroethane	1000 ug/mL
						Hexad	Hexadedane	3000 ug/mL
						Inden	Indeno[1, 2, 3-od]pyrene	1000 ng/mF
						Isoph	Isophorone	1000 ng/mL
						n-Decane	ane	1000 ug/mL
						NENET	N-Nitrosodi-n-propylamine	1000 ug/mL
						N-Nit	N-Nitrosodimethylamine	1000 ng/mt
						N-NTF	N-Nitrosodiphenylamine	2000 ng/mL
						n-Oct	n-Octadecane	1000 ug/mL
						Napht	Naphthalene	1000 ug/mL
						Nicro	Nicrobenzene	1000 ug/mL
						Penta	Pentachlorophenol	2000 ug/mL
						Phena	Phenanthrene	1000 Ng/mL
						Phenol	17	1000 ug/mL
						Pyrene	in the second	1000 ng/mL
Section of the sectio			The second second second		Commence of the Commence of th		The	1000 ng/mL
ME LISTO STK 00002	08/31/16		Restel, Lot A0108988		(Purchased Reagent)		Benzoic acid	
							TO THE PERSON NO.	2000 ug/mL
MB LISIA STK COUCE	08/33/16		Rekter, Lot Acloses9		(Furchased Reagent)	ĺ	the	2000 tq/mL
						Benza	Benzaldenyde	ZOUN UG/ML
COCC SOME COLUMN	A STATE OF THE PARTY OF THE PAR				4 7		Captotacam	70000 mg/mm
WE DISS STR DOUGE	91/15///0		Respect Lot AUITUSSI		(Furchased Readent)		3,3 -blchlorobengidine	TW/Dn nnn2
	The state of the s		1				dine	ZOOO nd/mr
MB SURR STS 00042	01/13/18		Rester, Lot A092712		(Furchased Reagent)		2, 4, 6-Trabromophenol	5000 ng/mL
						2-514	2-Sluorobiphenyl	2000 ng/mL
						TITE - CI		
						MILLO	61	5000 ng/mL
						phenolical	p-Terphenyl-dl4 (Surr)	5000 ug/mL
	-11-						2	HIN JEST DOOD
MB LILVI WRK 00110	03/21/16	09/22/15	09/22/15 Methylene Chloride, Lor	TO DE W	10 mL ME List1 INT 90021	100 ut 1,1 -Biphenyl	Biphenyl	2 ng/mE

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REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

Reagent ID Date		Towns or						
	-	Piep	Dilutant	Final	Reament ID	Volume	Analyte	Concentration
	+						1. 2. 4-Tricklorehensene	2 ser/mt
							1,2-Dichlorobenzene	
							1.2-Diphervlhydrazine	
							1.3-Dichlorobensene	
							1.3-Dinitrobenzene	
							1,4-Dichlosobensene	2 ng/mt
							1.4-Dioxane	
							1-Methylnaphthalene	2 ad/mL
							3.9 - axubis[1-chloropropana]	
							O 2 & 6-Terrach orcohorol	
							O A Coffee of crombane	
							TOTAL TOTAL	
							c, 4, o-Tttchtchtorophenol	
							2,4-Dicalorophenol	Z vg/mr
							2,4-Dimethylphenol	2 ng/mr
							2,4-Dinitrophenol	4 nd/mT
							O. 4-Dinierotolnene	2 nor/mI.
							The state of the s	Ampair C
							7' 0-DICUTORODUCTOT	
							2, 6-Dinitrotoluene	
							2-Chloronaphthalene	2 ug/mL
							2-Chlorophenel	2 na/ml.
							A section of the first of the f	The state of
							s-methylnaphthalene	
							2-Methylphenol	2 ug/mL
							2-Nitroeniline	2 na/mt
							S. W. Lindson B. Steiner	
							Nitrophenot	
							3-Nitroaniline	2 ng/mL
							4,6-Dinitro-2-methylphenol	4 novme
							4-Recompany about ather	2 na/mL
							a object of the state of the state of	
							4-CHIOLG-3-Methylphenol	
								Z Mg/mr
							4-Chlorophenyl phenyl ether	2 ug/mL
								2 nd/mL
							4-TVS From No. 1 min	S Northall.
							A Landarday	
							Communication of the Communica	July Say 5
							acanaphenene	MIN 2
							Acenaphthylene	Z ug/mr
							Acecophenone	Z ng/mp
							Aniline	2 ng/mT
							Anthracene	2 nd/mL
							Azobenzene	
							Benzo[a]anthracene	2 ng/mL
							Benzola Invrene	2 werling
							The state of the s	
							Benzolp) Iluoishthene	7 ag/mr
_							pengold'u'ilberylene	Turkur 5
							Benzo[k]fluoranthene	2 ng/mF
							Benzyl alcohol	2 ug/mL
							Bis(2-chloroethoxy)methane	2 wd/mL
							Bis(2-chloroethv1)ether	2 ug/mL
							Bis(2-ethylheryl) phthalate	2 ng/mL

REAGENT TRACEABILITY SUMMARY

Jap No.: 48D-89467-1 Lab Name: TestAmerica Buffalo

SDG No.:

				Toopent	Parent Reagent	E.		
Reagent ID	SMD Date	Prep	Dilutant	Final	Reagent ID	Volume	Analyte	Concentration
							Botyl bensyl phthalate	2 ug/mt
							Carbazole	Z 'ug/mL
							Chrysene	2 ng/mL
							Di-n-butyl puthalate	2 ng/mb
							Di-n-octyl phthalate	Z ug/mL
							Dibenz(a, n) anthracene	2 ng/mr
							Dibenzoluran	Z Ng/mE
							Diethyl phthalate	2 ug/mL
							Dimerny phone are	A 40 notes
							Uphenylamine	5,42 ug/mb
							FIGORATCHERE	Z ug/mt
							FIGOretie	2 ug/mt
							Hexachtoropensens	TIII / ST. 2
							Hexactiorobutablene	Z ng/mb
							Hexachlorocyclopentaglene	Z ug/mL
							Messacurornement	Turken C
							Telenoff 3 3-refluctions	July nut
							Translation of the call by Lette	
							and one of the	July S
							ar it became	Talen 2
							N-Nicossodi-n-propylamine	Z ng/mp
							N-Nitposodimethylamine	2 ug/mL
							N-Nitrosodiphenylamine	4 ng/mt
							n-Octadecane	2 wg/mL
							Naphthalene	2 ug/mL
							Nitrobenzene	2 ng/mr
							Pentachlorophenol	4 ng/mr
							Phenanthrene	2 ng/mls
							Phenol	2 ng/mt
							Pyrene	2 ug/mF
							Pyridine	2 ng/mL
							Benzolc acid	Z nd/mr
							Indene	2 ng/mL
							Atrazine	2 ug/mL
							Benzaldehyde	2 ug/mt
							Caprolactan	2 nd/mr
							3,3'-Dichlorobenzidine	2 ng/mf
							Benzidine	2 ug/mt
							2,4,6-Tribromophenol	2 ug/mL
							2-Fluorobiphenyl	2 ng/mt
							- 1	2 wg/mp
								2 ng/mL
							p-Terphenyl-d14 (Surr)	2 ng/mp
and the second second second			The second secon		The second second second second		_	2 ng/mr
.MB List1 INT 00021	07/31/16	09/21/15	Methylene Chloride, Lor	10 mL M	10 mL ME LIST STR 00023	2000 nl	1,1'-Biphenyl	200 ug/mL
			700001				1,2,4,5-Tetrachiotobensene	300 uc/mE
							I, 2, 4-Trichlorobengene	200 ug/ml.

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REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

Neagent ID Added Added			7		Headent	Patent Reagent			
1. 2 Optical confidence 1. 2 Optical confidence 1. 2 Optical confidence 1. 3 Optical confi	Reagent ID	EMp	Prep Date	Dilutant	Final		/olume	Analyte	Concentration
1.3 - 10, 10, 10, 10, 10, 10, 10, 10, 10, 10,								1,2-Dichlorobensene	200 ag/mL
1.3 = 0.00 to the content of the con								1, 2-Diphenylhydrazine	200 ug/m5
1.4 7 D. CADAM CONTROL								I, 3-Dichlorobenzene	200 ug/mL
1.4 - 20.0 colored and the col								I,3-Dinitrobenzene	200 ug/mL
1 - A - A - A - C - C - C - C - C - C - C								1,4-Dichlorobenzene	200 ug/mL
1. 2 osgythate 2.								1,4-Dioxane	200 ng/mL
2.3 4.6 G-Fee to add a loc top game								1-Methylnaphthalene	200 Ng/mE
2. 4. 4. 6. 4° Catachiac cophenol 2. 4. 4. 6. 4° Catachiac cophenol 2. 4. 4° Catachiac cophenol 3. Catachiac copheno								2,2'-oxybis[1-chloropropane]	200 ug/mL
2. 4, 6-Tack All crypthenol 2. 4 - Tack All crypthenol 3. 4 - Tack All crypthenol 4. 4 - Tack All crypthenol 5. 4 - Tack All crypthenol 5. 4 - Tack All crypthenol 5. 5 - Tack All crypthenol 5. 5 - Tack All crypthenol 5. 5 - Tack All crypthenol 5. 5 - Tack All crypthenol 5. 5 - Tack All crypthenol 5. 5 - Tack All crypthenol 5. 5 - Tack All crypthenol 5. 5 - Tack All crypthenol 6. 5 - Tack All cryp								2, 3, 4, 6-Tetrachlorophenol	200 ng/mt
2. 4 - Tuchia crophenol 2. 4 - Tuchia crophenol 2. 4 - Dunia Crophenol 2. 4 - Dunia Crophenol 2. 4 - Dunia Crophenol 2. 5 - Dunia Crock Leepe 2. 6 - Dunia Crock Leepe 2. 6 - Dunia Crock Leepe 2. 6 - Dunia Crock Leepe 2. 6 - Dunia Crock Leepe 3 Chia Crophenol 3 Chia Crophenol 3 Chia Crophenol 3 Chia Crophenol 3 Chia Crophenol 3 Chia Crophenol 3 Chia Crophenol 4 Chia Crock Leepe 3 Chia Crock Leepe 3 Chia Crock Leepe 3 Chia Crock Leepe 4 Chia Crock Leepe 4 Chia Crock Leepe 4 Chia Crock Leepe 4 Chia Crock Leepe 4 Chia Crock Leepe 4 Chia Crock Leepe 4 Chia Crock Leepe 4 Chia Crock Leepe 4 Chia Crock Leepe 4 Chia Crock Leepe 4 Chia Crock Leepe 4 Chia Crock Leepe 4 Chia Crock Leepe 4 Chia Crock Leepe 4 Chia Crock Leepe 4 Chia Crock Leepe 4 Chia Crock Leepe 4 Chia Crock Leepe 4 Chia Crock Leepe 5 Chia Crock Leepe 6 Chia Croc								2, 4, 5-Truchlorophenol	200 ug/mL
2.4.4 Thuse Lyty pletenoid 2.4.4 Thuse Lyty pletenoid 2.4.4 Thus Lyty pletenoid 2.4.4 Thus Lyty pletenoid 2.4.4 Thus Lyty pletenoid 2.4.4 Thus Lyty pletenoid 2.4.4 Thus Lyty pletenoid 2.4.4 Thus Lyty pletenoid 2.4.4 Thus Lyty pletenoid 2.4.4 Thus Lyty pletenoid 2.4.4 Thus Lyty pletenoid 2.4.4 Thus Lyty pletenoid 2.4.4 Thus Lyty pletenoid 2.4.4 Thus Lyty pletenoid 2.4.4 Thus Lyty pletenoid 2.4.4 Thus Lyty pletenoid 3.4.4 Thus Lyty Lyty pletenoid 3.4.4 Thus Lyty Lyty pletenoid 3.4.4 Thus Lyty Lyty pletenoid 3.4.4 Thus Lyty Lyty pletenoid 3.4.4 Thus Lyty Lyty Lyty Lyty Lyty Lyty Lyty Lyt								2,4,6-Trichlorophenol	250 ng/mL
2.4 4-Unit trophenol 2.4 4-Unit trophenol 2.5 4-Unit trophenol 2.5 4-Unit trophenol 2.5 4-Unit trophenol 2.5 4-Unit trophenol 2.5 4-Unit trophenol 2.5 4-Unit trophenol 2.5 4-Unit trophenol 2.5 4-Unit trophenol 2.5 4-Unit trophenol 2.5 4-Unit trophenol 2.5 4-Unit trophenol 2.5 4-Unit trophenol 2.5 4-Unit trophenol 2.5 4-Unit trophenol 3.5 4-Uni								2,4-Dichlorophenol	300 ug/mt
2.4 - O'LAN IN INCOCOLUMENT 2.6 - O'LAN IN INCOCOLUMENT 2.6 - O'LAN IN INCOCOLUMENT 2.7 - O'LAN INCOCOLUMENT 3.7 - O'LAN INCOCOLUMENT 3.7 - O'LAN INCOCOLUMENT 4.7 - O'LAN INCOCOLUMENT 5.7 - O'LAN INCOCOLUMENT 6.7 - O'LAN INCOCULUMENT 6.7 - O'L								2,4-Dimethylphenol	200 ug/mL
2. 6 - D.1. All to recording the control of the con								2,4-Dimitrophenol	400 ng/mL
2. 6-Dilit tocal disease 2. 6-Dilit tocal disease 2. Child oraginate 3. Child oraginate 3. Child oraginate 3. Child oraginate 4. Child oraginate 3. Child oraginate 4. Child oraginate 5. Child oraginate 6.							2,4-Dinitrotoluene	200 ug/mL	
2 -Chlocomplythalene 2 -Chlocomplythalene 2 -Chlocomplythalene 2 -Chlocomplythalene 2 -Chlocomplythalene 2 -Chlocomplythalene 2 -Chlocomplythalene 2 -Chlocomplythalene 2 -Chlocomplythalene 2 -Chlocomplythalene 2 -Chlocomplythalene 3 -Chlocomplythalene 4 -Chlocomplythalene 4 -Chlocomplythalene 4 -Chlocomplythalene 4 -Chlocomplythalene 4 -Chlocomplythalene 5 -Chlocomplythalene 6 -Chloco								2,6-Dichlorophenol	200 ng/mL
2 - Chio torpith thall are 2 - Chio torpith thall are 2 - Chio torpith thall are 2 - Chio torpith thall are 2 - Chio torpith thall are 2 - Chio torpith thall are 2 - Chio torpith thall are 2 - Chio torpith thall are 3 - Sittorant il ne 4 - Chio torpith to chart to								2,6-Dimitrotoluene	200 ug/mL
2 Actiny impurital inegation of a control in							-	2-Chloconaphthalene	200 ug/mL
2-Methylphenol. 2-Mitophenol. 2-Mitophenol. 3-Mitophenol. 4-Mitophenol. 4-Chloroghenol. 4-Chloroghenol. 4-Chloroghenol. 4-Mitophenol. 4-Mitophenol. 4-Mitophenol. 4-Mitophenol. 5-Mitophenol. 6-Mitophenol. 6-Mitoph								2-Chlorophenol	200 ug/mL
2-Mitrophenol 2-Mitrophenol 3-Mitrophenol 3-Mitrophenol 4-Dinitro-2-methylphenol 4-Dinitro-3-methylphenol 4-Chioto-3-methylphenol 4-Chioto-3-methylphenol 4-Chioto-3-methylphenol 4-Mitrophenol 4-Mitrophenol 4-Mitrophenol 6-Chioto-3-methylphenol 7-Chioto-3-methylphenol 6-Chioto-3-methylphenol 7-Chioto-3-methylphenol 6-Chioto-3-methylphenol 7-Chioto-3-methylphenol 6-Chioto-3-methylphenol 7-Chioto-3-methylphenol 6-Chioto-3-methylphenol 7-Chioto-3-methylphenol 7-Chioto-3-methylphenol 8-Chioto-3-methylphenol 8-Chioto-3-methylphenol 8-Chioto-3-methylphenol 8-Chioto-6-Michael 8-Chioto								2-Methylnaphthalene	200 ng/mL
2-Nitrophenol 2-Nitrophenol 3-Nitrophenol 4-5-Unitrophenol 4-Chlorophenyl phenyl ether 4-Chlorophenyl phenyl ether 4-Chlorophenyl phenyl ether 4-Chlorophenyl phenyl ether 4-Nitrophenol 4-Nitrophenol 5-Nitrophenol 6-Chlorophenol 7-Nitrophenol 8-Nitrophenol 8								2-Methylphenol	200 ng/mL
2-Mittophenol 4,6-Dinitro-2-methylphenol 4-Chloto-2-methylphenol 4-Chloto-3-methylphenol 4-Chloto-3-methylphenol 4-Chloto-3-methylphenol 4-Methylphenol 4-Methylphenol 4-Methylphenol Acetophenol Acetophenol Acetophenol Benololl anthiacene Recophenol Recophenol Benololl anthiacene Benolol								2-Natroenaline	200 ug/mL
4.5-Innitro-2-methylphenol 4.5-Innitro-2-methylphenol 4.5-Innitro-3-methylphenol 4.5-Innitro-3-methylphenol 4.5-Innitro-3-methylphenol 4.5-Innitro-3-methylphenol 4.5-Innitro-3-methylphenol 4.5-Innitro-3-methylphenol 4.5-Innitro-3-methylphenol 4.5-Innitro-3-methylphenol 5.5-Innitro-3-methylphenol 6.5-Innitro-3-methylphenol 6.5-Innitro-3-methylp								2-Nitrophenol	200 ng/mL
4.6 Clubito-2-methylphenol 4-Chloto-3-methylphenol 4-Chloto-3-methylphenol 4-Chloto-3-methylphenol 4-Chloto-phenyl phenyl ether 4-Chloto-phenyl phenyl sther Acenaphthylene Bencolg anthracene Bencolg hylpene Bencolg hylpene Bencolg hylpene Bencolg hylpene Bencolg hylperylene Bencolg hylpene Bencolg hylperylene								3-Nitpoaniline	200 Mg/mL
4 - Brompheny i pheny i ener facilities and facilit								4,6-Dinitro-2-methylphenol	400 ug/mL
4-Chlorocalities 4-Chlorocalities 4-Chlorocalities 4-Chlorocalities 4-Nitronilies 4-Nitronilies 4-Nitronilies Acenghithes Acenghithles Acenghithles Acenghithles Acenghithles Acenghithles Acenghithles Acenghithles Acenghithles Benzo[a]authlese								4-Bromophenyl phenyl ether	200 ug/mt.
4-Chlorophenyl phenyl sther 4-Methylphenol 4-Nirophenol 4-Nirophenol Academoniline 4-Nirophenol Academoniline Academoniline Academonic Academon								4-Chloro-3-methylphenol	200 ug/mL
4-Chlorophenyl phenyl ather 4-Witroaniine 4-Witroaniine Acetophenol Acetophenol Acetophenoe Acetophenoe Acetophenoe Acetophenoe Acetophenoe Benzo[a] arthrace Benzo[a] pytene								4-Chloroaniline	200 ng/mL
4-Nitrohitine 4-Nitrohitine 4-Nitrohitine Acengulthene Acengulthlene Acengulthlene Acengulthlene Acengulthlene Acengulthlene Acengulthlene Acengulthlene Acengulthlene Benso[a]authracene								4-Chlorophenyl phanyl sther	200 Mg/mL
4-Witrophenil Acenghithen Acenghithen Acenghithen Acenghithen Acenghithen Acenghithen Acenghithen Acenghithen Acenghithen Acenghithen Acenghithen Benzo[a]anthracene Benzo[a]historathene Benzo[a]historathene Benzo[c]alchorathene								4-Methylphenol	200 ug/mL
Ace tophenol Ace aphthylene Ace tophenone And line Anthreache Anthreache Benzo(a) Interarchene Benzo(b) fluoranthene Benzo(c) fluoranthene								4-Nitroaniline	200 ng/mL
Acetophthylene Acetophthylene Acetophthylene Antithe Antithe Anthescene Benzo[a] anthtacene Benzo[a] lanthtacene Benzo[b] fluoranthene Benzo[c] th.iperylene								4-Nitrophenol	400 ng/mr
Antithe Antithe Antithe Antithe Antithe Antithe Antithe Antithe Antithe Antithe Antithe Antithe Antithe Antithe Antithe Antithe Benzolal anthracene Benzolal Antithere Benzolal Antital							Acenaphthene	200 ng/mL	
Antilne Antilne Agharache Agharache Benzo[a] anthracene Benzo[b] £lucranthene Benzo[b] £lucranthene Benzo[b] £lucranthene Benzo[b] £lucranthene Benzo[c] £lucranthene								Acenaphthylene	200 ug/mL
Anthine Acobarene Acobarene Benzo(a anthracene Benzo(a) Liperylene Benzo(b) flucranthene								Acetophenone	7m/6n 002
Agobaquene Antheacene Benzo[a] anthtacene Benzo[a] Pluocanthene Benzo[a] hiperylene							-	Aniline	Tuy navur
Muchangene Benzo[a] anthracene Benzo[a] pyrene Benzo[a] pyrene Benzo[b] fluoranthene Benzo								Anchracene	200 ug/mL
Benzo[a] anthracene Benzo[b] fluoranthene Benzo[c] fluoranthene								Azobenzene	200 ug/mL
Benzo(a) Huccarthene Benzo(g, h, i) perviene Benzo(g, h, i) perviene Benzo(g, h, i) perviene Benzo(g, i) duoranthene Benzo(g, i) alchoranthene Benzo(g, i) alchoranthene Benzo(g, i) alchoranthene Benzo(g, i) alchoranthene								Benzo[a]anthiacene	200 ug/mL
Benzo(b)fluctanthene Benzofg, Ailperylene Benzofg, Ailperylene Benzofg, Ailconanthene Benzof, Ailconanthene Benzof, Ailconanthene Benzof, Ailconanthene Bis(2-chloroethoxy)methane Bis(2-chloroethoxy)methane								Benzo[a]pyrene	200 ng/mL
Benzo[g.h.i]perylene Benzo[g.h.i]perylene Benzo[g.h.i]perylene Benzo[g.h.i]perylene Benzo[g.h.i]perylene Benzo[g.h.i]perylene Benzo[g.h.i]perylene Benzo[g.h.i]perylene								Benzo[b]fluoranthene	
Bengof & Iduoranthene Bengof alcohol Bis(2-chloroethory)methane Bis(2-chloroethory)methane Bis(2-chloroethory) methane								Benzolg, h, ilperylene	200 ug/mL
Beneyl alcohol								Benso[k]fluoranthene	200 ng/mt
Bis(2-chorocthoxy) methane Bis(2-chorocthoxy) methane Bis(2-chorochy) bisher								Benzyl alcohol	200 ng/mL
Bis(2-chloroethyl) ether Bis(2-chloroethyl) ether								Bis(2-chloroethoxy)methane	250 ug/mL
Rig(2)-etby/hexyl nhthelete								Bis(2-chloroethyl) ether	200 Mg/mt
								Bis(2-ethylbexyl) phthalate	200 ug/mL

11/13/2015

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REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

				Townson.	The Country of the latest of t			
Readent ID	Exp	Prep	Dilutant	Final	Readestt II	Wolume	Analyte	Concentration
41			3				o long to	200 ac/mt
							Concentration	200 ac/mL
							Wi-p-buttyl phthalate	200 na/ml.
							Di-n-octv1 obthalate	200 ug/mL
							Dibenz(a, h) anthracene	200 ug/mL
							Dibenzofuran	200 ng/mL
							Diethyl phthalate	200 wg/mL
							Dimethyl phthalate	200 ug/mL
							Diphenylamine	342 ng/mL
							Fluoranthene	200 ug/mL
							Fluorene	250 ng/mL
							Hexachlonobenzene	200 ug/mt
							Hexachlorobutadiene	200 ug/mL
							Hexachlorocyclopentadiene	200 ng/mL
							Hesachloroethane	200 ug/mL
							Hexadecane	200 ng/mL
							Tudenoll, c, 5-cd py tene	THI / DTI OC 2
							Isophorone	TW/80 002
							n-Decane	200 ug/mL
							N-MILLOSCOI -M-Propyramine	Tur/for no/
							N-Nitrosodimethylamine	200 ng/mL
							N-Nitrosodiphenylamine	400 ng/mF
							n-Octadecane	200 ng/mt
							Naphthalene	200 Mg/mL
							Nitrobenzene	200 ug/mL
							Pentachlorophenol	400 ug/mt
							Phenanthrene	200 ug/mL
							Phenol	280 ug/ml.
							Pyrene	200 ug/mL
							Pyridine	200 ug/mL
				×	ME LISIG STE JOODS	1000 nr	. Benzoic acid	200 ng/mL
							_	200 ug/mL
				N.	MB L1211 STK 00002	1000 ur	-	200 ng/mF
							Benzaldehyde	200 ng/mL
				-1			Captolactam	7m/6n 002
				21	MB L189 STK 00002	1000 aL	_	200 ng/mr
				19			_	200 ug/mL
				20	ME SURE STR DOUGE	400 nr		ZOG ng/mr
							2-Ellorobiphenyl	200 ug/mL
								200 ng/mt
								200 wg/mL
							p-Terphenyl-d14 (Surr)	200 ng/mL
							Phenol-d5	200 ng/mt
ME LISI STR 00023	12/31/16		Restel, Lot Adilly34		(Purchased Reagent)	ent)	I, I "-Biphenyl	1000 ug/mL
							1,2,4,5-Tetrachlorobenzene	1000 ng/mF
							1,2,4-Trichterobenzene	TOOO MG/ME
							1,2-Dichlorobenzene	1000 ug/ml
							aurantin-function att	The light of the

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

Respont Date Date Volume	TT TTOTAL OF							
Unchemians Interpretation Interpreta	DECoporate Are	EMP	Prep	Dilutant Used	Final	/olume Added	Analyte	Concentration
probenzene nem nem nem nem nem nem ne							1.3-Dicklorobensene	3000 acr/m
handensene handen hande		Ī					1.3-Dinitrobenzene	1000 ng/m
whethere we want to the control of t							1 4-Pichlorchendene	1000 nove
naphthalene loghthalene loghthalene chlorophenol chlorophenol chlorophenol chlorophenol lorophenol							I.4-Diosana	1990 1970
chloropropane] chlorophenol chlorophenol chlorophenol chlorophenol chlorophenol trophenol phenol sphthalene henol sphthalene henol sphthalene henol sphthalene shol shol shol shol shol shol shol shol							1-Methylnaphthalene	1000 ud/m
Tetrachlorophenol chlorophenol chlorophenol chlorophenol chlorophenol cophenol corphenol corporation corphenol corphenol corphenol corphenol corphenol corphenol corphenol corphenol corphenol corphenol corphenol corphenol corphenol corphenol corphenol corphenol corphenol corphenol corporation corphenol cor							7 2'-ceutralia-chiotopropanal	m/m na/m
chlorophanol chlorophanol chlorophanol chlorophanol hyphenol trophenol trophenol trophenol trophenol trophenol trophenol trophenol maghthalene benol aphthalene benol troloue enol troloue							2. 3. d. 6-Patrach prophenol	1000 407/1
chicophenol chicophenol hylphenol tophenol tophe							o A significant prophenol	1000 CAN
control phenol hylphenol trophenol trophenol trophenol trophenol trophenol trophenol trophenol phenol							TOTAL TOTAL	m/fm over
intiphenol rophenol rophenol rophenol rophenol rotoluene rotoluene maphthalene maphthalene henol miline henol miline henol miline miline miline henol miline henol miline henol miline miline henol cone conocanthene none no							2, 4, 6-Truchlorophenoi	1000 ng/m
inylphenol rophenol rocoluene orophenol rocoluene ophenol rocoluene ophenol folio fo							2,4-Dichlotophenol	1000 ug/m
trophenol trophenol frotoluene northenol suphthalene benol suphthalene benol suphthalene benol sulline enol sulline sulline sulline sulline sulline sulline sulline sunline sulline sunline							2,4-Dimethylphenol	1000 ug/m
Coroplouene Coroplouene aphthalene aphthalene hencl hencl hencl hillne cro-2-methylphencl fillne fillne fillne fillne fillne hencl h							2,4-Dimittophenel	2000 ug/mt
recognized and recognized applications appli							2,4-Dinitrotoluene	1000 ug/mL
rotoluene hench hench hench hench hench hench hench hench hilne hench hilne hench hilne hench he							2,6-Dichlorophenol	1000 ug/mL
naphthalane higherd aphthalane henci hiline rico-Zenethylphanol filine firio-Zenethylphanol filine miline henci Jamethylphanol filine henci henc							2.6-Dinitrotoluene	1000 ng/m
henci laphthalene laphthalene labhene lablene							O-Chloropanhthalana	1000 0001
intence. Julian Juli							2 cm oconaphonatene	m/Sm poor
aphtraisms henci liline lenci liline lenci liline lenci -co-2-methylphenci -co-2-methylphenci -co-2-methylphenci henci henci henci henci henci henci henci henci liline henci lone lon							Touroblienor	11/D1 0007
henci Aline Thine Thine Thine Thine Thine The part of the part Thine The part							2-Methylnaphthalene	3000 ud/m
hiline iiline iiline iiline iiiline iiiline iiiline iiline iil							2-Methylphenol	1000 ng/m
rehol illine ro-2-methylphenol for illine for illine henol henol henol illine henol henol henol luline heno honol luline honol honol luline honol honol luline honol hono							2-Nitroamiline	1000 ug/mL
riline rio-2-methylphenol a-methylphenol aviline henol henol filline henol filline henol ylene henol lone							2-Nitrophenol	1000 ng/mL
rc-2-methylphenol lenyl phenyl ether 3-methylphenol miline henyl phenyl ether henol miline henol miline henol mithe henol hene henol hene henol hene hene hene hene hene hene hene hen							3-Natroenaline	1000 ug/mL
Jane In the state of the state							4 K-Dimitro-9-methylphonol	MAN WORLD
							d-Remorkant phany ether	TODG MAY'N
							d promobnema buenat cruer	III/BN DOOT
nuline henvi phenvi ether henvi iline henvi henv							4-Chlord-3-methylphenol	1000 mg/m
hhenyl phenyl ether hhenol hilline henol henol henol henol henol hone hone hone hone hone hone hone hone							4-Chloroaniline	1000 ug/m
illine fenol filline fenol fenol fenol fenol fenol filore filorestatene filorestatene footol footoethosy)methane footoethosy)m							4-Chlorophenyl phenyl ether	1000 ug/m
niline ene ene ene injue injue interaces anthraces interaces inter							4-Methylphenol	1500 ng/mL
venoi vene vene vone vone vene vene vene vene							4-Nithognaline	1000 Mg/mL
vene yylene none ne ne nhthracene yyree lucranthene lucranthene cohel olocethoxy)methane colocethoxy)methane sylhexyl) thhar sylhexyl) phthalate							4-Nitrophenol	2000 ug/m
nylene none ne							Acenaphthene	1000 166/10
none ne ne ne lucture lucture lucture cohol oroethory)methare cotothyl) ather oroethyl) ather ne ne ne ne ne ne ne ne ne							Acenaphthylene	1000 ng/mL
ne anthracene yyrene l'avcanthene l'avcanthene l'avcanthene tohel olocethoxy)methane olocethoxy)methane olocethoxy)methane olocethoxy)iether							Acetophenone	1000 ng/m
le huthacene yyene 1 luovanthene 7 livovanthene cohol oroethoxy)methane oloethyl)ether ylhexyl; phthalate							Aniline	IGOO MC/ML
whitzeene yhene luoranthene \(\triangle{\pi}\) \(\triangle{\pi}\) \							Anthracene	1000 ug/mt
onthracene yyrene laucranthene l'alucranthene l'alucranthene l'obsethoxy)methane olosethoxy)methane isylheryllether sylheryllether							Azobenzene	1000 ud/m
yrehe Ilucrathene Ilucrathene Ilucrathene cohol orocthoxy)methane orocethy/), ether ylhexyl; phthalate syl phthalate							Benzo[a]anthracene	1000 ug/mL
luoranthene A. Iperylene Cohol Oscethosyjmethane cotethosyjmethane oscethyljether oscethyljether sylhesylj phthalate							Benzo[a]pvrene	1000 uq/mL
n, ilperylene ll worathene tohel oloethoxy)methane oloethoxy)methar sylhexyl; phthalate syl phthalate							Benzo[b]fluorgnthene	1000 uq/mL
Elvoranthene tohon! toroethoxy)methane toroethyllether nylhexyl) phthalate syl phthalate							Benzolg, h, 1] perylene	1000 ng/mt
cohel oroethoxy)methane oroethyl)ether vylhexyl; phthalate							Benzofklfluoranthene	1000 WG/m
Oloethoxy)methane Oloeethyjlether sylhexyl) phthalate							Benzyl alcohol	1000 ud/m
loroethyllether hylhexyl) phthalate nayl phthalate							Bis (2-chloroethosy) methane	1000 ud/m
yjhexyl phthalate nayl phthalate							Bis (2-chloroethy)) ether	1000 ug/m
izyl phthalate							Ris [2-stholhexy]] nhthalate	1880 110/m
							Rietz Panovi shrhalata	1000 1000
							Carbagole	1000 1070
							Chrysene	1000 144/10

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Job No.: 480-89467-1

COD NO.	
restamentes bullato	
DOD Names	GEN MAN
-1	

Page Page	Eng. Date	Eag Prep Dilterin Sinal Wolume Wolume Added					Readent	Pacent Reagent	25		
Di-Trickly Di-Milater 2000 Di-Trickly Di-Milater 2000 Di-Trickly Di-Milater 2000 Di-Prickly Di-Milater 2000	Display Continued Disp	02 08/31/15 Regret, Lot A0108988 (Eurchased Reagent) 02 09/31/16 Regret, Lot A0108989 (Furchased Reagent) 03/31/16 Regret, Lot A0110231 (Eurchased Reagent) 03/31/16 09/22/15 Methylene Chlotide, Lot A0110312 (Furchased Reagent) 03/21/16 09/22/15 Methylene Chlotide, Lot A0101031 400 ME	Reapent ID	EMp	Prep		Final	Reagent ID	Volume Added	Analyte	Concentration
11 12 12 13 14 14 14 14 14 14 14	11-1	02 08/31/15 Rettek, Lot 80108986 (Eutchased Reagent) 02 08/31/15 Rettek, Lot 80108986 (Furchased Reagent) 03/31/16 Rettek, Lot A0110231 (Eutchased Reagent) 03/21/16 09/22/15 Methylene Chlotide, Lot 10 mL ME Lish_INT_B0021 400 ml								Di-n-butyl phthalate	1000 ng/mt
Comparison of the Company of the C	Checker Chicker Chic	02 08/31/15 Rester, Lot A0108988 (Euchased Reagent) 02 08/31/16 Rester, Lot A0108989 (Furchased Reagent) 02 07/31/16 Rester, Lot A0110231 (Furchased Reagent) 02 07/31/16 Rester, Lot A032712 (Furchased Reagent) 03/21/16 09/22/15 Methylene Chlotide, Lot 10 mL MB Lish_LNT_0001 400 mL								Di-n-octyl phthalate	1000 ug/mL
District District	Discript_Distributes 2000 Disc	02 09/31/15 Rester, Lot A0108986 (Futchased Reagent) 02 08/31/16 Rester, Lot A0109399 (Futchased Reagent) 2 07/31/16 Rester, Lot A0110231 (Futchased Reagent) 2 07/31/16 Rester, Lot A0310231 (Futchased Reagent) 2 07/31/16 09/22/15 Methylene Chlotide, Lot 10 mL MB Listl_LNT_00021 400 mL								Dibenz(a, h) anthracene	1000 nd/mF
Control of the Cont	Discript Pathwales 2000 Electric Pathwales 2000	02 08/31/16 Rester, Lot A0108988 (Furchased Reagent) 02 08/31/16 Rester, Lot A0108989 (Furchased Reagent) 03/21/16 09/22/15 Methylene Chlotide, Lot 10 mL MB_Listl_INT_00021 400 ML								Dibenzofuran	1000 ug/mL
The court late of the countries The countries 1300	The county later The county	02 08/31/16 Restex, Lot A0108988 (Sutchased Reagent) 02 08/32/16 Restex, Lot A010231 (Sutchased Reagent) 03/31/16 Restex, Lot A0110231 (Sutchased Reagent) 03/21/16 09/22/15 Methylene Chlotide, Lot IO mL ME_Listling_00021 400 mL								Diethyl phthalate	1000 ng/mL
Titoring	Pincipal P	02 08/31/16 Retex, Lot A0108988 (Eutchased Reagent) 02 08/31/16 Retex, Lot A0108989 (Furchased Reagent) 03/21/16 99/22/15 Methylene Chloride, Lot IO mL Ms Liter INT 00021 400 mL								Dimethyl phthalate	
100 canname	Thorstone Thor	02 08/31/16 Restek, Lot A0108988 (Zunnhased Reagent) 02 08/31/16 Restek, Lot A0110231 (Zunnhased Reagent) 03 /31/16 Restek, Lot A0110231 (Zunnhased Reagent) 03 /31/16 Restek, Lot A0110231 (Zunnhased Reagent) 03 /31/16 N9/22/15 Methylene Chlotide, Lot 10 mL MB_Listi_INT_D0021 400 mL								Diphenylamine	
	Paccalliotoconcedession 2000	02 08/31/15 Restek, Lot 60108988 (Eutchased Reagent) 02 08/31/16 Restek, Lot 60110231 (Eutchased Reagent) 2 07/31/16 Restek, Lot 60110231 (Eutchased Reagent) 2 07/31/16 09/22/15 Methylene Chlotide, Lot 10 mL MB_Listl_INT_00031 400 mi								Fluoranthene	1m/on 0001
Heart Hear	Secretary Secr	02 08/31/16 Restex, Lot A0108988 (Futchased Reagent) 2 07/32/16 Restex, Lot A0110231 (Futchased Reagent) 2 07/32/16 Restex, Lot A0110231 (Futchased Reagent) 2 07/32/16 Wetheren Chloride, Lot T0 mL MS_List_INT_00021 400 un								House Danger	1000 10/m
Headen H	High control	02 08/31/16 Rester, Lot A0108986 (Eutchased Reagent) 02 08/31/16 Rester, Lot A0108986 (Eutchased Reagent) 03/31/16 Rester, Lot A0110231 (Eutchased Reagent) 03/21/16 09/22/15 Methylene Chlotide, Lot IO min Ms_Listl_INT_00021 400 min								Hexachloromitadiene	
Hosasch Lorcethane 1000	The state clotter continue The state clotter continue Total Continue	02 08/31/15 Rester, Lot 60108988 (Futchased Reagent) 02 08/31/16 Rester, Lot A0108989 (Futchased Reagent) 2 07/31/16 Rester, Lot A0110231 (Futchased Reagent) 2 07/32/16 Rester, Lot A03712 (Futchased Reagent) 2 07/32/16 Rester, Lot A092712 (Futchased Reagent) 1 03/21/16 09/22/15 Methylene Chloride, Lot 10 mL MB Listi INT 00021 400 un								Haxachionoevelonantadiana	
Tridenofile 2.3-cdipyrene 1000	Timedeno(1.c. 3-cd)pytene 1000 1200boctor 1000boctor 1000 1200boctor 1000boctor	02 08/31/16 Restex, Lot A0108988 (Eurchased Reagent) 2 07/31/16 Restex, Lot A010231 (Furchased Reagent) 2 07/31/16 Restex, Lot A03712 (Furchased Reagent) 2 01/12/18 Restex, Lot A092712 (Furchased Reagent) 2 01/12/18 Restex, Lot A092712 (Furchased Reagent) 2 118685 Lot A092712 (Furchased Reagent) 3 03/21/16 09/22/15 Rethylene Chlotide, Lot 10 mL MB_Listl_INT_00021 400 un								Hexachloroethane	
Indeed City 3-cd jpytene 1000 1	Technology	02 08/31/16 Restex, Lot A0108988 (Euchased Reagent) 02 08/31/16 Restex, Lot A0108989 (Furchased Reagent) 2 07/31/16 Restex, Lot A0110231 (Furchased Reagent) 2 07/31/16 99/22/15 Methylene Chlotide, Lot 10 mL MB_Listl_INT_00021 400 ut								Hexadecane	1000 ng/mL
1000 1000	Total Tota	02 08/31/16 Restex, Lot 80108988 (Surchased Reagent) 02 08/31/16 Restex, Lot 8010231 (Surchased Reagent) 03/21/16 09/22/15 Methylene Chloride, Lot 10 mL MB_List_INT_00021 400 mL								Indeno[1, 2, 3-cd]pyrene	1000 ng/mT
The contact	N=1/2 N=1/	02 08/31/16 Rester, Lot 80108988 (Sutchased Reagent) 03 07/31/16 Rester, Lot 80108989 (Sutchased Reagent) 03/21/16 09/22/15 Methylene Chlotide, Lot 10 mL MB_Lishi_INT_00021 400 ui								Isophorone	1000 ng/mL
N. M. t. Coscolar Properties 1000	Comparison	02 08/31/16 Regret, Lot A0108988 (Purchased Reagent) 02 08/31/16 Regret, Lot A0108989 (Purchased Reagent) 03/31/16 09/22/15 Restek, Lot A0310231 (Purchased Reagent) 03/21/16 09/22/15 Methylene Chloride, Lot 10 mL MB_Listi_INT_00021 400 ui								n-Decane	2000 ug/mL
N-Mittococlumethylamine	NANT troscolimethylamine 1000	02 08/31/16 Regrex, Lot A0108988 (Furchased Reagent) 02 08/31/16 Regrex, Lot A0108989 (Furchased Reagent) 2 07/31/16 Regrex, Lot A0110231 (Eurohased Reagent) 2 07/31/16 09/22/15 Methylene Chlotide, Lot 10 mL MB_list_INT_00021 400 un								N-Nitrosodi-n-propylamine	3000 ug/mL
N=Microsocippenylamine 2000	Namic closed planty Lamine 1000	02 08/31/16 Regret, Lot 80108988 (Furchased Reagent) 02 08(31/16 Regret, Lot 8010231 (Furchased Reagent) 03/31/16 Pestek, Lot 80110231 (Furchased Reagent) 01/12/18 Restek, Lot 803712 (Furchased Reagent) 03/21/16 09/22/15 Wethylene Chlotide, Lot 10 mL MB_list_INT_00021 400 uk								N-Nitrosodimethylamine	1000 ug/mL
The contraction of the contrac	Compared to the children	02 09/31/15 Regrez, Lot A0108988 (Purchased Reagent) 2 07/31/16 Restez, Lot A0108989 (Purchased Reagent) 2 07/31/16 Restez, Lot A0110231 (Eurchased Reagent) 2 07/31/16 09/22/15 Methylene Chloride, Lot 10 mL MB_List_INT_00021 400 ui								N-Nitrosodiphenylamine	2000 ug/mL
Naghtiatene 1000	Application Application	02 08/31/16 Regter, Lot 80108988 (Futchased Reagent) 02 08/31/16 Regter, Lot 80108989 (Futchased Reagent) 2 07/31/16 Regter, Lot 80110231 (Eutchased Reagent) 2 07/31/16 09/22/15 Methylene Chlotide, Lot 10 mL MB_listl_INT_00021 400 un								n-Octadecane	1000 ng/mr
The control of the	National Series National S	02 08/31/16 Regret, Lot 80108988 (Furchased Reagent) 02 08/31/16 Regret, Lot 80108989 (Furchased Reagent) 03/31/16 09/22/15 Methylene Chlotide, Lot 10 mL MB_list_INT_00021 400 uk								Naphthalene	1000 ng/mF
2000 Phenol Pestek, Lot A0108988 (Futchased Reagent) Perol 2000 Phenol 1300	2000 Electric color	02 08/31/16 Regrez, Lot A0108988 (Purchased Reagent) 02 08/31/16 Regrez, Lot A0108989 (Purchased Reagent) 03/31/16 09/22/15 Restek, Lot A0310231 (Purchased Reagent) 03/21/16 09/22/15 Methylene Chloride, Lot 10 mL MB_Listi_INT_00021 400 ui								Nitrobensene	1000 ng/mt
Phononthreps Phon	Phenatthrene 1000	02 08/31/16 Regter, Lot R0108988 (Futchased Reagent) 02 08/31/16 Regter, Lot A0108989 (Futchased Reagent) 2 07/31/16 Regter, Lot A0110231 (Eutchased Reagent) 2 07/31/16 09/22/15 Wethylene Chlotide, Lot 10 mL MB_list_INT_00021 400 un								Pentachiorophenol	2000 ng/mL
Pytenol Pyte	2000 20031/16 Restex, Lot A0108988 (Eutchased Reagent) Prenct acid 1000	02 08/31/16 Regret, Lot 80108988 (Furchased Reagent) 02 08/31/16 Regret, Lot 80108989 (Furchased Reagent) 03/21/16 09/22/15 Methylene Chlotide, Lot 10 mL MB_list_INT_00021 400 uk								Phenanthrene	1000 ng/mL
Paralle Paralle Paralle Paralle Paralle Paralle 1300	Pyridine Preset Principal Pyridine 1300	02 08/31/16 Regrez, Lot A0108988 (Furchased Reagent) 2 07/31/16 Restez, Lot A0108989 (Furchased Reagent) 2 07/31/16 Restez, Lot A0310231 (Furchased Reagent) 2 07/31/16 09/22/15 Methylene Chloride, Lot 10 mL MB_List1_INT_00021 400 ui								Phenol	1000 ng/mt
Series, Lot A0108988 (Furchased Reagent) Syridine Syridine Syridine Syridine Syridine Syridine Syridine Succession Indense Succession Indense Succession Indense Succession Indense Succession Indense Succession Indense Succession Suc	Percent Perc	02 08/31/16 Restex, Lot A0108988 (Putchased Reagent) 2 07/31/16 Restex, Lot A0108989 (Putchased Reagent) 2 07/31/16 99/22/15 Methylene Chloride, Lot 10 mL MB Listi_INT_00021 400 un								Pyrene	1000 ng/mr
02 08/31/16 Restek, Lot A0108988 (Surchased Reagent) Encasts 2000 22 08/31/16 Restek, Lot A0108989 (Rutchased Reagent) Encast Edebyde 2000 23 00/31/16 Restek, Lot A0110231 (Eutchased Reagent) Encast Edebyde 2000 2	Sektek, Lot A0108988	02 08/31/16 Restek, Lot 80108988 (Sutchased Reagent) 02 08/31/16 Restek, Lot 80108989 (Sutchased Reagent) 03/31/16 09/22/15 Methylene Chlotide, Lot 10 mL MB_list_INT_00021 400 uk								Pyridine	1000 ng/mr
10 10 10 10 10 10 10 10	1 1 1 1 1 1 1 1 1 1	02 08/31/16 Rektek, Lot A0108989 (Furchased Reagent) 2 07/31/16 Restek, Lot A0310231 (Furchased Reagent) 2 07/31/16 09/22/15 Methylene Chloride, Lot 10 mL Ms_Listi_INT_00021 400 ui	MB LISIO STY 05002	08/31/16		Restel, Lot A0108988		(Putchased Reag	ent)	Benzoic acid	2000 ug/mL
Sektek, Lot A0108989 Sektek, Lot A0108989 Segent) Attactive Deposate Deposat	Attractive Attractive Attractive 2000	02 08/31/16 Rektek, Lot A0108989 (Furchased Reagent) 2 07/31/16 Restek, Lot A032712 (Furchased Reagent) 2 01/12/18 Restek, Lot A092712 (Furchased Reagent) (93/21/16 09/22/15 Wethylene Chlotide, Lot 10 mL MB Listi LNT 00021 400 un								Indene	2000 ug/mF
2 07/31/16 Restek, Lot A0110231 (Eutchased Reagent) Benzaldehyde 2000 2 13.7-Dichlorobenzidine 2000 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Sestek, Lot A0110231	2 07/32/16 Restek, Lot A0110231 (Eurohased Reagent) 2 01/12/18 Restek, Lot A092712 (Purchased Reagent)	MB LISL STK GOGG2	-				(Furchased Reag	ent)	Atrazine	2000 ng/mL
OP/12/16 Restek, Lot A0310231 (Furchased Reagent) 2.31-Dichlorobenzidine 2000	Captolatian Captolatian	2 07/32/16 Restek, Lot A0310231 (Furchased Reagent) 2 01/12/18 Restek, Lot A092712 (Purchased Reagent) 03/21/16 09/22/15 Methylene Chloride, Lot 10 mL Ms_Listi_INT_00021 400 uL								Benzaldehyde	2000 ug/mL
2 07/31/16 Restek, Lot A0110231 (Furchased Reagent) 8.3 **Dichlotobenzidine 2000 2.000 Restek, Lot A092712 (Furchased Reagent) 2.4,6 **Tithcomphenol 5000 2.5 **Iuorobaphenol 5000 2.5 **Iuorobaphen	2 07/21/16 Restek, Lot A010231 (Furchased Reagent) 8.3 ** ** ** ** ** ** ** ** ** ** ** ** **	2 07/31/16 Restek, Lot A092712 (Purchased Reagent) 2 01/12/18 Restek, Lot A092712 (Purchased Reagent) (93/21/16 09/22/15 Methylene Chloride, Lot 10 mL MB Listi LNT 00021 400 ul								Caprolactam	2000 ug/mL
2 01/12/18 Restet, Lot A092712 (Purchased Reagent) 2.4,6-Tibromophenol 5000 2.4 Lot A092712 (Purchased Reagent) 2.4,5-Tibromophenol 5000 2.7 Louorophenol 5000 2.7 Louorophenol 5000 Presphenol 5000 Presphenol 5000 Presphenol 6000 Prespheno	Seatek, Lot R092712	2 01/12/18 Restek, Lot N092712 (Purchased Reagent) (03/21/16 09/22/15 Wethylene Chloride, Lot 10 mL MB_List_INT_00021 400 un	MB LIS9 STR 00002	01/33/10		Rester, Lot A0110231		(Surchased Read	enc	3, 3 - Dichlotobenzidine	Zooo ng/mp
1,12/16	1,2/16	01/12/18 Rester, Lot A092/12 (Furchased weagent) 03/21/16 09/22/15 Methylene Chloride, Lot 10 mL M8_List_INT_00021 400 ui	W. b. of the first majority.	2000			1			Benzidine	2000 ng/mL
2-2100c001000011 2-2100c00100011 2-2100c00100011 2-2100c00100011 2-2100c00100011 2-2100c00100011 2 2-2100c00100011 2 2 2 2 2 2 2 2 2	Sample S	03/21/16 09/22/15 Methylene Chloride, Lor 10 mL MB Listi LNT 00021 460 ul	ME SURE STR 00042	01/11/18		Rester, Lot AG92712		(Furchased Read	ent)	2, 4, 6-Tribromophenol	Soon nd/mr
03/21/16 09/22/15 Werhylene Chloride, Lot 10 mL MB List1_INT_00021 400 uL 1.1*Rephenyl-did (Surr) 1.2.9 / FT Chloride 1.2.9 / FT Chloride 1.2.9 / ST Chloride 1.3.9 / ST Chlorid	03/21/16 09/22/15 Wethylene Chloride, Lot 10 mL MB Listi LNT 00021 400 uL 1/1-8 phenyl 1,2-9.5-Tetrachlorobensene 1,2-9.5-Tetrachlorobensene 1,2-9.5-Tetrachlorobensene 1,2-0.00000000000000000000000000000000000	03/21/16 09/22/15 Methylene Chloride, Lor 10 mL MB_Listi_INT_00021 400 ul								2	5000 ug/mL
03/21/16 09/22/15 Methylene Chloride, Lot 10 mL MB List1_INT D0021 400 uL L.1-Ethhenyl L.2-Dichlorobenzene L.2-Dichlorobenzene L.2-Dichlorobenzene L.2-Dichlorobenzene L.2-Dichlorobenzene L.2-Dichlorobenzene L.3-Dichlorobenzene	03/21/16 09/22/15 Methylene Chloride, Lot 10 mL ME Listi INT 00021 400 ut 1,1-8tphenyl 1,2-9,5-Teirachlorobenzene 1,2-9,5-Teirachlorobenzene 1,2-9,5-Teirachlorobenzene 1,2-9,5-Teirachlorobenzene 1,2-9,5-Teirachlorobenzene 1,2-9,10-710-710-710-710-710-710-710-710-710-7	03/21/16 09/22/15 Methylene Chloride, Lor 10 mL MB List_INT_00021 400 ul								Totalionor at a	THI / BR BORG
03/21/16 09/22/15 Methylene Chloride, Lot 10 mL MB Lisb1_INT_00021 400 uL Lil-Bibhenyl 1,2/6,5-Teirachlorobenzene 1,2/6,5-Teirachlorobenzene 1,2-0:chlorobenzene 1,2-0:chlorobenzene 1,2-0:chlorobenzene 1,2-0:chlorobenzene 1,2-0:chlorobenzene 1,2-0:chlorobenzene 1,2-0:chlorobenzene 1,3-0:chlorobenzene 1,3-0:chlorobenzene 1,3-0:chlorobenzene	Parechemy and (Surr) Parechemy and (Surr) Parechemy and (Surr) Parechemy and (Surr) [1,2,4,5-Terrachlorobenses and (Surr) [1,2-9,4-Terrachlorobenses and (Surr) [1,2-9,4-Terrachlorobenses and (Surr) [1,2-9,4-Terrachlorobenses and (Surr) [1,2-9,4-Terrachlorobenses and (Surr) [1,3-9,4-Terrachlorobenses and (Surr) [1,3-9,4	03/21/16 09/22/15 Wethylene Chloride, Lor 10 mL M8_List_INT_00021 400 ui.									TW/BR DOOS
03/21/16 09/22/15 Wethylene Chloride, Lor 10 mL MB List1_INT_00021 400 uL 1.1" - 8 thhen! 1.2" - 9.5" Tetrachlorobenzene 1.2" - 9.5" On the Chloride 1.2" - 9.5" Tetrachlorobenzene 1.3" - 9.5" Tetrachlorobenzene	03/21/16 09/22/15 Werbylene Chloride, Lot 10 mL MB List1_INT_00021 400 ut 1.1'-Elphemyl 1.5'-F-F-Errachlorobenzene 1.2'-P-F-F-F-F-F-F-F-F-F-F-F-F-F-F-F-F-F-F-	03/21/16 09/22/15 Wethylene Chloride, Lor 10 mL MB_Lisel_INT_00021 400 uL					1			- 1	THE PROPERTY OF
03/21/16 09/22/15 Methylene Chloride, Lor 10 mL MB Lisel_INT_00021 400 uL 1.1.8khbenyl 8	03/21/16 09/22/15 Methylene Chloride, Lor 10 mL MB Lisel LNT 00021 400 uL 1.1 **Ekhhenyl 8	03/21/16 09/22/15 Methylene Chloride, Lor 10 mL MB 11sbl INT 00021 400 uh									THIND MONE
1,2,4,5-Tetrachlorobensene 1,5,4-Tetrachlorobensene 1,5-Tetrachlorobensene 1,2-Tetrachlorobensene 1,3-Tetrachlorobensene	1,2,4,5-Tetrachlorobensene 1,2,4-Tetrachlorobensene 1,2-01chlorobensene 1,2-01chlorobensene 1,3-01chlorobensene 1,3-01chlorobensene		MB LILVI WRK 00112		09/22/15	Methylene Chloride, Lot	10 mL P	(B List1 INT 00021	400 ut		
ne Je	1,2,4-Trichlorobenzene 1,2-Dichlorobenzene 1,2-Dichlorobenzene 1,3-Dichlorobenzene	1,2,4-Trichle 1,2-Dichle 1,2-Dichle 1,2-Dichle 1,2-Dichle 1,3-Dichle 1,3-Dichles				2 2 2 4 4 4				1, 2, 4, 5-Tetrachlorobenzene	8 ng/mL
90	1, 2-Dichlorobensene 1, 2-Diphenylhydratine 1, 3-Dichlorobensene	1,2-Dichlord 1,2-Dichlord 1,2-Dichlord 1,3-Dichlord								1,2,4-Trichlerobenzens	a ng/mp
96	1,2-Diphenylhydratine 1,3-Dichlorobenzene	1.2-Diphenyll 1.3-Diphenyll 1.								1,2-Dichlorobensene	8 ng/mr
	Tra-transconding	1,53-1012041020								1,2-Diphenylbydrazine	Jm/bn 8
							Ì			1, 3-Dichlorobehzene	S ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

	Concentration			a ag/mr	8 ng/mr	8 ng/mT	8 ng/mF	8 wer/mL	8 not/ml.		Turi o	TWING O	To nd/mr		S ug/mr	8 ng/mL	S ng/mr	8 ng/mL		100000000000000000000000000000000000000		8 ng/mr	8 ng/m[8 ng/mr	16 ug/mL		B Ng/mL	B ng/mL		July so	16 ua/mL	8 ng/ml.		8 ug/mL	8 nd/mF	8 ug/mL	8 ug/mt	8 ug/mL	8 ug/mL	8 uq/mL		8 ng/mL	8 Mg/mL		S worker		S wer/ml	THE PERSON OF	Dell 2500 0
	Analyte	1,3-Dinitrobenzene	1,4-Ulchioropenzene	1,4-ULOXBRE	1-Methylnaphthalene	2,2 ~ oxybis[1-chloropropane]	2, 3, 4, 6-Tetrachlorophenol	2.4.8-Frichlorophenol	2.4. 6-Freschlorophenol	9.4-Dirhiorombenoi	A A Trimpt by I whom a	2.4 - DING CHATCHIOT	2,4-Dinicrophenol	2,4-Dimittotoluene	2, 6-Dichlorophenol	2,6-Dinitrotoluene	2-Chloronaphthalene	2-Chlorophenol	0-Marthy Loughtha Jana	7 Mark Landon Command	C-Metnyllphenol	2-Nitroaniline	2-Nitrophenol	3-Nitroaniline	4,6-Dinitro-2-methylphenol	4-Bromophenyl phenyl ether	4-Chloro-3-methylphenol	4-Chloroaniline	4-Chlorophenyl phenyl etner	4-Methylphenol	4-Nitrophanol	Tenanthana	Acenaphthylene	Acetophenone	Aniline	Anthracene	Azobenzene	Benzo[a]anthracene	Benzo[a]pyrene	Benzo[b]fluorenthene	Benzo[g,h,1]perylene	Benzo[k]fluoranthene	Benzyl alcohol	Rie (3-chlorosthose) methans	Dis / 3 - while restrict lather	Bin () - other [hours] phiths ato	Burni hanny whitelets	Purchased a	200000000000000000000000000000000000000
120	Volume																																																
Parent Reagent	Reagent ID																																																
Hadebat	Final																																																
-	4	-																																															
	Dilutant																																																
	Dilutant																																																

11/13/2015

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REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 48D-89467-1

ropane] enol enol ether ether thane thane ete	Prep Dilteat Final Wolume Added 14-0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.	00100
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REAGENT TRACEABILITY SUMMARY

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22/31/16 Restex, Lot A0111934 Purchased Reagent 1.1 Highent 1.2.4 Trachlotobenzene 1.2.4.5.7 = Trachlotobenzene 1.2.0.4.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0	22/31/16 Restex, Lot A0111934 (Furthsed Reagent) 1,1.**Infremy: 1,2.**Infremy: 1,2.**Infremy: 1,2.**Infremy: 1,2.**Infremy: 1,2.**Infremy: 1,2.**Infremy: 1,2.**Infremy: 1,2.**Infremy: 1,2.**Infremy: 1,3.**Infremy: 1,4.**Infreme: 1,3.**Infremp: 1,4.**Infreme:	12/31/16 Rester Lot A0111934 (Purchased Reagent) 1.1 "Emphesy 1
12/31/16 Rester, Lot A0111934 (Purchased Reagent) 1.1. Liphenyi 1.2. 4.5 Tetrachlorobenzene 1.2. 4.5 Tetrachlorobenzene 1.2. 4.5 Tetrachlorobenzene 1.2. Diphenyi hydratne 1.3 Diphenyi hydratne 1.3 Diphenyi hydratne 1.3 Diphenyi hydratne 1.4 D	12/31/16 Restex, Lot A0111934 (Furthased Resgent) 1.2-Birhesyl 1.2-Birh	12/31/16 Restex, Lot A0111934 (Furthased Reagent) 1.1'-Hiphenyl
1,2,4,5-Tettactlorobenzene 1,2,4-Fucudatorobenzene 1,2-Dichenzene 1,2-Dichenzene 1,3-Dinhenzihydigine 1,3-Dinhenzene 1,4-Dichenzene 1,4-Dichenzene 1,4-Dichenzene 1,4-Dichenzene	1,2,4,5-Tettachlotobenses 1,2,4-Tettachlotobenses 1,2-Dichlotobenses 1,2-Dichlotobenses 1,3-Dichlotobenses 1,3-Dichlotobenses 1,3-Dichlotobenses 1,4-Dichlotobenses 1,4-Dichlotobenses	To a Company of the C
corobenzene benzene benzene benzene enzene	corobenzene benzene henzene benzene benzene	
benzene hydiazine obenzene benzene	obenzene hydrazine benzene oenzene	
hydratine benzene cenzene	hydratine benzene oenzene obenzene	
obenzene oenzene obenzene	obenzene oefizene obenzene	
oenzene	oenzene	21
opensene	obenzene	

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

				Toolean	Patent Reagent			
Reagent ID	Emp	Prep	Dilutant	Final	We Reagent ID Ac	Volume Added Analyte	Concentration	STION
						1. Watther I wanter had been	1m/10m 600/4	Total Contra
						a seculymaphinateles		M/451
						The Contraction of the Contracti	Total Control	Too / on
						o A Miles of hydroxyland		1 Con 1 Con 1
						o a Safer of company	THIN DOOR	Terr / mil
						2 4 Contraction of the	0000	The John
						5,4-Dichiorophenoi	TOOR DOOR	TAGY DE
						2,4-DimethyIphenol	1000 Wg/mE	Mg/m
						2,4-Dinitrophenol	2000 x	ng/mL
						2, 4-Dinitrotoluene	1000 ng/mL	md/m
						2.6-Dichlorophenol	1000 ug/mL	tla/m
						5 Mallimitrate Inches	Imites of the	at Credita
						Total and supplied on a	10001	117 / 571
						auareundenorororo-2	THE PROPERTY OF THE PROPERTY O	M / Del
						2-Chlorophenol	1000 ug/mL	md/m
						2-Methylnaphthalene	Jm/60 0001	n/5n
						2-Methylphenol	1000 ug/mL	nd/u
						2-Nitroaniline	1000 ng/mL	n/LDI
						A Market Contraction	Transport Contraction	the James
						E-Machodinessor	0000	157
						3-Miccogniline		TAG/ II
						4,6-Dinitro-2-methylphenol	51000 ug/mL	nd/bn
						4-Bromophenyi phenyl ether	1000	nd/mr
						4-chloro-3-methylphenol		MG/m
						4-Chloroaniline	1000 ug/mL	ma/m
						J-Chlorophany phany athan		WALL TO
						d-Wether) where a	T	7 200
						4-Metnythnenor	TWO WE'S WIT	mg/gw
						4-Nitroaniline	1000 ug/mL	md/m
						4-Nitrophenol	7,000	Mg/mL
						Acenauhthene	1000 ug/mL	Ma/m
						Arenanhthylene	TRAB ner/ml.	TENTE
						and the state of t	1000 40/10	WAY TO
						Dec 2 to 1	00000	
						Aniine	TW/Dn noot	md/m
						Ancuracene	TOWN WEYMEN	Ing / In
						Azonenzene	TOTAL PROPERTY OF THE	md/En
						Benzo[a]anthracene	1000 ng/mF	ng/m
						Benzo[a]pyreme	Tanga agyan	md/m
						Benzo[b]fluoranthene	1000 ug/mL	m/bn
						Benzold, h, ilpsrylene	IOOO nd/mr	m/Ln
						Benzof Clinoranthene	1000 ug/mL	m/bn
						Benzyl alcohol	1000 ng/mL	May m
						Rist2-on proethowy meth.		waxm
						Big (2-chloropthyllathar		mar/m
						6-6 E4-440 [1000 [104-6] 0 10 10 10 10 10 10 10 10 10 10 10 10 1		1000
						Bas c - stuyinenyi, put na	1	11 / Est
						Bucyl Denzyl pronalate	1000 tg/mL	mg/m
						Carbazole	1000 ug/mt	ug/m
						Chrysene	1000 ug/mL	m/dn
						Di-n-butyl phthalate	1000 nd/mr	md/m
						Di-n-octyl phthalate	1000 ug/mt	md/m
						Dibenz(a, h) anthracene	1000 ug/mL	nd/u
						Dibenzofuran	1000 ng/mL	u/Bu

REAGENT TRACEABILITY SUMMARY

Concentration

Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

SDG No.:

	ne Analyte	Diethyl phthalate Dimethyl phthalate Dimethyl phthalate Diphenylamine Fluoranthene Fluoranthene Haxachlorobycropentadiene Haxachlorobycropentadiene Haxachlorobycropentadiene Haxachloropycropentadiene Haxachloropycropentadiene Haxachloropycropentadiene Haxachloropynamine N-Nitrosodinethylamine	Bensoic acid	Atrazine Benzaldehyde Caprolactam	3,3'-Dichlorobenzidine Benzidine	2.4.6-Tibbromophenol 2-Fluorobhenol Nicrobensene-d5 (Surr) presynenyl-d14 (Surr) Phenol-d5	500 ut 1,1'-Biphenyl 1,2'4,5-Tetrachlorobensen 1,2'1-Chlorobensen 1,2'-Diphenylhydesine 1,5'-Dinthlorobensen 1,5'-Dinthlorobensen 1,4'-Dinthlorobensen 1,4'-Dinthlorobensen 1,4'-Dinthlorobensene 1,4'-Dinthlorobensene 1,4'-Dinthlorobensene 1,4'-Dinthlorobensene 1,4'-Dinthlorobensene
Pacent Reagent	Reagent ID Added		(Burchased Reagent)	(Punchased Reagent)	(Furchased Reagent)	(Furchased Reagent)	13 au MB Listl 1MT 00021 500
Tueppear	Dilutant Final Final Welume		Restel, Lot A0108988	Rektek, Lot 80108989	Sestek, Lot Adlib231	Restek, Lot A092712	09/22/15 Methylene Chiorids, Lot 13 all F
	Prep		5	19	9		
	EMP		08/31/16	08/31/16	07/31/16	01/12/18	03/53/10
	Reagent ID		MB Lisio STK 00002	MB Lisii STK 00002	MB L189 STR 00002	MB SURR STR 00042	MB_LILVI_WRK_00113

3000 ug/mL 1000 ug/mL

10 ug/mL 10 ug/mL 10 ug/mL 10 ug/mL 10 ug/mL 10 ug/mL 10 ug/mL

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REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 48D-89467-1

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

				Tooleant	Patent Reagent	20		
Reagent ID	EMT	Prep	Dilutant	Final	Reagent ID	Volume	Analyte	Concentration
							Dimethyl phthalate	10 nerimin
							Dinbenylamine	TT. T. not/ml.
							Thoranthana	
							Fluorene	10 ng/mL
							Hexachlorobenzene	10 ng/mL
							Hexachlorobutadiene	10 ng/mr
							Hexachlorocyclopentadiene	10 wg/mg
							Hexachloroethane	10 ng/mL
							Hexadecane	10 ng/mt
							Indeno[1, 2, 3-od]pyrene	10 ug/mL
							Isophorone	10 ng/mr
							n-Decane	10 ng/mt
							N-Mitrosodi-n-propylamine	10 ug/mL
							N-NILDOSOGIDBELINTAMINE	TO REVIEW
							N-NITEOSOGIPhenylamine	10 ng/mr
							Naphthalana	10 ser/mp
							Nitrobensone	10 seriet
							Pentachlorophenol	20 ug/mL
							Dhonon	To south
							phanal	10 vo/mt.
							Carrana	July par Of
							Puridina	10 ng/mg
							Benzole acid	10 weaml.
							Indene	10 nd/mL
							Atrazine	10 ug/mt
							Benzaldehyde	10 ng/mL
							Captolactam	10 ng/ml
							3, 3'-Dichlorobenzidine	TO Mg/mT
							Benzidine	10 ug/mL
							2,4,6-Tribromophenol	10 ug/mL
							TAUAUTOTOTOT Z	10 ug/mL
							Mirror Bonnender of Charle	10 10/10
							n-More language - Aft Const.	10 wayan
				i			-1	10 uc/mt
.MB LISEL INT 00021	07/31/16		09/21/15 Methylene Chloride, Lot	N Ju or	TO ME LIST STR 00023	2000 uL	-	200 ug/mL
			118685				1.3.4.5-Tettachlorobenzene	200 ng/mL
							2 O Al-The All-Cachangana	700 ver/mf.
							1 2-Director on the contraction of the contraction	1m/pn 002
							1.2-Dinhenvihvdrazine	200 ng/mb
							I. 3-Dichlorobengene	200 ng/mL
							1,3-Dimitrobenzene	200 ng/mL
							1,4-Dichlosobenzene	7m/5m 002
							1,4-Dickane	200 ug/mL
							1-Methylnaphthalene	200 ng/mL
							2, 2 - oxybis[1-chloropropane]	200 ng/mL

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REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 48D-89467-1

				Thearent	Facent headent		
Reagent ID	EMP	Prep	Dilutant	Final	Reagent ID Added	Analyte	Concentration
						2,3,4,6-Tetrachlorophenol	200 uq/mL
						2,4,5-Trichlorophenol	200 ug/mb
						2,4,6-Trichlorophenol	200 ug/mL
						2,4-Dichlorophenol	200 ng/mL
						2.4 -Dimethylphenol	200 ug/mL
						2.4-Dimitrophenol	400 ng/m
						2.4-Dimitrofoluene	200 wa/mL
						2,6-Dichlorophenol	200 ud/mL
						2,6-Dinitrotoluene	200 ng/mL
						2-Chloronaphthalene	200 ng/mL
						2-Chloronbenol	280 no/ml.
						0-Marthy Inaphthalone	300 ua/mL
						0-Mathylphanol	July not mil
						2-Nitroanilina	200 waymI.
						3-Wetrophanel	200 ver/m1
						3-Virtuganilane	200 kg/mL
						d. 6-Dimitto-O-methylphon.	400 ucr/mL
						J-Rromonhoved whored other	300 vov/mt
						d-Chloro-3-mathylnbenol	200 novm
						d-Chloroaniline	200 no/ml.
						4-chlorophenyl phenyl ather	200 novmt
						4-Methylphenol	200 ug/mL
						J-Nathonnal the	900 warm
						d-Mithorhamon	Wind Son
						Tons on hithory	100 kg/m/
						Acenaonthene	200 mg/m
						Acenaphtnylene	day ngy ma
						Acetophenone	200 ng/mL
						Aniline	200 ng/mL
						Anthracene	200 Ng/mL
						Azobenzene	200 ug/mL
						Benzo[a]anthracene	July ng/mL
						Benzolalpyrene	200 ug/mL
						penzo pitraoranthene	700 nd/mr
						Benzo[g,h,1]perylene	200 ug/mL
						Benzo[k]fluoranthene	200 ug/mt
						Benzyl alcohol	200 ug/mL
						Bis(2-chloroethoxy)methane	200 ug/mL
						Bis/2-chloroethyl)ether	200 ug/mL
						Bis(2-ethylhexyl) phthalate	Z00 ug/mL
						Butyl Densyl phthalate	200 ng/mL
						Carbazole	200 Mg/mL
						Chrysene	200 ug/mL
						Di-n-butyl phthalate	200 ng/mt
						Di-n-octyl phthalate	200 ug/mL
						Dibenz (a, b) anthracene	200 ng/mL
						Dibenzofuran	200 wa/mL
						Diethyl phthalate	200 ug/mL
						Dimethyl phthalate	200 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 48D-89467-1

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REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

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TestAmerica	
Name	No.:
Lab	SDG

				Toolean	Parent Reagent	222		
Reagent ID	EMT	Prep	Dilutant	Final	Reagent ID	Volume	Analyte	Concentration
							Fluorene	3000 uq/mt
							Hexachlorobenzene	1000 ud/mL
							Hexachlorobutadiene	Jm/6n 000I
							Hexachlorocyclopentadiene	1000 ng/mL
							Hexachlorosthane	1000 ug/mL
							Hexadecane	1000 ng/mt
							Indeno[1, 2, 3-od]pyrene	1000 ng/mr
							Isophorone	1000 ug/mL
							n-Decane	1000 ng/mL
							N-Nitrosodi-n-propylamine	1000 ug/mL
							N-Nitrosodimethylamine	
							N-Nitrosodiphenylamine	2000 ug/mt
							n-Octadecane	1000 ug/mL
							Naphthalene	TOOO WEYME
							Nicrobenzene	TOOO BELLET
							Presentational	SOOG REALES
							Phone in the same	THE PROPERTY OF THE PARTY OF TH
							Phenot	TOOG REVUE
							President	Tayon advan
2000 COMMON CONTRACTOR OF THE PERSON CO.	S S C A S S S S S S S S S S S S S S S S		200		4	14-1-1	Pytrathe	This of the
MB LISTO STK 000002	08/31/16		Rester, Lot AUIG8988		(Furchased Reagent	(aue)	Benzolc auld	2000 ng/mL
3 A A A A A A A A A A A A A A A A A A A	2000						Indene	ZOOO ng/mr
MB LISIL STK 00002	08/33/16		Rekter, Lot A0108989		(Eurohased Reagent)	(ent)	Atrazine	2000 ng/mt
							Benzaldehyde	2000 Mg/mL
							CaptoLactem	2000 ug/mL
MB 1159 STK 00002	07/31/16		Rester, Lot A0110231		(Furchased Reagent)	(ent)	3,3 -Dichlorobenzidine	2000 ug/mL
							Benzidine	2000 ug/mL
MB SURR STX 00042	01/12/18		Restel, Lot A092712		(Puruhased Reagent)	(ent)	2, 4, 6-Tribromophenol	5000 ng/ml
							2-Fluorobiphenyl	SOOO NG/ML
								Pooo ng/mr
								SOOO ng/mL
							D-Terohenyl-d14 (Surr)	2000 ug/mL
							- 1	
MB LILVI WRK 00114	91/12/ED	09/32/15	Methylene Chloride, Lor 118685	10 mL M	TO ME LISTI INT DG021	70 009	1,1Bipbenyl	12 ug/mL
							1,2,4,5-Tetrachlorobenzene	12 ug/mL
							1.3,4-Trichlorobenzene	12 ng/mL
							1,2-Dichlorobenzene	12 ng/mL
							1,2-Diphenylhydrazine	
							1,3-Dichlorobensene	12 ng/mL
							1,3-Dinitrobenzene	12 ng/mr
							1,4-Dichlorobenzene	12 ng/mL
							1,4-Dioxane	12 ag/mL
							1-Methydnaphthalene	12 ug/mr
							c.s -cRybis I-chiotopiopane	12 ag/mil
							5 4 S-Trick prophens	12 Ma/mL
				i			2,4,6-Trichlorophenol	12 ug/mL
				Danc 00 of	900			ANDC/21/24
				rage 32 of 320	220			1710/2010

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

				Tanana	Patent Reagent		
Reagent ID	EMP	Prep	Dilutant	Final	Reagent ID Added	ume Analyte	Concentration
CO & CO & CO					Ì	2. 4-Diealor	10 working
						2.4-Dimethylphenol	12 wg/mb
						2.4-firmitrophenol	
						2.4-Dinitrotollene	12 novmb
						2.6-Dichlorophenol	12 ug/mL
						2.6-Dimitrotoluene	12 nd/mL
						2-Chloronaphthalene	12 wg/mL
						2-Chlorophenol	12 ug/mL
						2-Methylnaphthalene	12 ug/mL
						2-Methylphenol	12 ug/mL
						2-Nitroaniline	12 ug/mL
						2-Nitrophenol	12 ud/mL
						3-Nitroaniline	12 ug/mL
						4,6-Dinitro-2-methylphenol	24 ng/mL
						4-Bromuphenyl phenyl ether	12 ug/mL
						4-Chloro-3-methylphenol	12 ug/mL
						4-Chloroaniline	12 ug/mL
						4-Chlorophenyl phenyl ether	12 ug/mL
						4-Methylphenol	12 ng/mL
						4-Nitroaniline	12 ng/mL
						4-Nitrophenol	24 ng/mr
						Acenaphthene	12 ug/mL
						Acenaphthylene	12 ng/mt
						Acetophenone	12 Mg/mL
						Aniline	12 ug/mL
						Anthracene	12 ug/mt
						Azobenzene	12 ug/mL
						Benzo[a]anthracene	12 ug/mL
						Benzo[a]pyrene	12 ug/mL
						Benzo[b]fluoranthene	12 ug/mL
						Benzo[g,h,i]perylene	12 ng/mL
						Benzo[k]fluoranthene	12 ug/mL
						Benzyl alcohol	12 ug/mF
						Bis (2-chloroethoxy) methane	12 ug/mL
						Bls(2-chloroethyl)ether	12 ug/mb
						Bis(2-ethylhexy1) phthalate	12 ng/mL
						Buryl benzyl phthalate	12 ug/mL
						Carbazole	12 ug/mL
						Chrysene	12 ug/mL
						Di-n-butyl phthalate	12 ng/mL
						Di-n-octyl phthalate	
						Dibenz(a, h) anthracens	12 ug/mL
						Dibenzofuran	
						Diethyl phthalate	12 ng/mL
						Dimethyl phthalate	12 ug/mL
						Diphenylamine	20,52 ug/mt
						Fluoranthene	12 ug/mL
						Fluorene	12 ng/mL

REAGENT TRACEABILITY SUMMARY

Jap No.: 480-89467-1 Lab Name: TestAmerica Buffalo

Recogning TO Direct Direct Direct Total Recogning TO Notation Recogning TO Notation Recogning TO Notation Total					Woodshart	Patent Readent	100		
Preside Control Resident President Control Resident 192	Reagent ID	Exp	Prep	Dilutant	Final	Reagent ID	Volume	Ånalyte	Concentration
Reconstitution makes Reconstitution makes								Hexacillorobensene	12 na/mt
								Hexachloroburadiene	
								Hexachlorocyclopentadiene	
Tidenticle, 2, 2-cipyrane 12								Hexachiorosthane	
Tieghborote 12 Tieghborote 12								Hexadecane	12 ug/mL
The Control of the								Indenoil, 2, 3-odipyrene	12 ng/mL
N-15 to sood— n-p. 12								Isothorone	12 wg/mL
No. No.								#100mp	12 nd/ml.
Pijitoseodijnethyjanine 12								N-Nitrosodi-n-propylamine	12 ng/mt
Mark Considerable Mark								N-N-trosodimethylamine	12 ug/mL
Number-1016 Number-1016								N-Nitrosodiphenylamine	24 ug/mL
Mittobersee								n-Octadecase	12 wayne.
Pencenthrese								Naphthalene	12 nd/ml.
Pientanthrepse Pientanthrepse 24								Nitrobangana	12 wc/mL.
Shennathtreps Shennathtreps 12								Dancachloronhanol	24 WorkmI.
Pictor P								Dhananthrane	12 gg/mL
District District								Dieno	12 uc/mL
Paristine								Purene	12 ug/mt.
Paralle Para								Puridine	12 nd/mL
Indems Inde								Benzoic acid	
Paralide delyde Paralide Pa								11.40.50	10 Marine.
Second Second								AMBEN -	
The control of the								france debuge	
12 3.3 - 10.cd/locobenizidine 12 12 13 13 14 14 15 15 15 15 15 15								Denzaldenyde	12 ng/mr
3.3 'Dithicochemiaine 12								Captolactam	
Penalthree 2,46-Tithree 2,46-Tithree 2,46-Tithree 2,46-Tithree 2,46-Tithree 2,46-Tithree 2,46-Tithree 2,46-Tithree 1,24-Tithree 1,24-Tithree 1,24-Tithree 1,24-Tithree 1,24-Tithree 1,3-Tithree 1,3-Tithree 1,4-Tithree 2,3-Tithree 2,3-Tithree 2,3-Tithree 2,3-Tithree 2,4,6-Tithree 2								3,3'-Dichlorobenzidine	
2.4,6.Tithromophenol 2 = 100 cobinghenol 2 = 100 cobinghenol 2 = 100 cobinghenol 3 = 118685 118685 118685 11.2,4.Titchlorobensene 11.2,4.Titchlorobensene 11.3-10 cobensene 11.3-10 cobensene 11.3-10 cobensene 11.3-10 cobensene 12.4-Titchlorobensene 13.4-10 cobensene 13.4-10 cobensene 14.4-10 cobensene 14.4-10 cobensene 14.4-10 cobensene 13.4-10 cobensene 14.4-10 cobensene 13.4-10 cobensene 13.4-10 cobensene 14.4-10 cobensene 13.4-10 cobensene 14.4-10 cobensene 13.4-10 cobensen								Benzidine	
2-8100.004pheny1 2-810.004pheny1 2-810.0								2,4,6-Tribromophenol	12 ug/mL
Maintenance Maintenance								2-Eluorobiphenyl	
Natrobensenserd5 (Surr)								2-glucrophenol	
107/31/16 Wethylene Chloride, Lor 10 mL MB Li21 STK 00023 2000 mL 1.1" Bighenyl 12.0 mL 12								Nicrobenzene-dS (Surr)	12 ug/mL
10731/15 Methylene Chloride, Lot 10 th MB L151_STR 00023 2000 nL 1.1"-Bighenyl 1.2,4,5-Tetrachlorobenzene 1.2,4,5-Tetrachlorobenzene 1.2,0 th lorobenzene 1.2,0 th lorobenzene 1.3-th chlorobenzene 1.3-th chlorobenzene 1.4-th chlorobenzene 1.4-th chlorobenzene 1.4-th chlorobenzene 1.4-th chlorobenzene 1.4-th chlorobenzene 1.4-th chlorophenol 2.3,4,6-Tetrachlorophenol 2.3,4,6-Tetrachlorophenol 2.4,6-Tetrachlorophenol 2.									12 ng/mL
118685 1286710100benzene 118685 118685 118685 1286711000benzene 118685 1286711000benzene 118685 1286711000benzene								Phenol-d5	12 ug/mL
1.2,4,5-Tetrachlorobensene 1.2,4-Trachlorobensene 1.2-10.thlorobensene 1.3-10.thlorobensene 1.3-10.thlorobensene 1.4-10.thlorobensene 1.4-10.thlorobensene 1.4-10.thlorobensene 2.2'-coxplesil-chloropropane) 2.3,4,6-Tetrachloropropane) 2.4,6-Tetrachlorophenol 2.4,6-Tetrachlorophenol 2.4,6-Tetrachlorophenol	OB List1 INT 00021	01/31/16	-	Methylene Chloride, L		E L151 STK 00023	2000 al	_	200 ug/mL
1.2,4-Trachlorobenzene 1.2-Drachenyludazine 1.2-Drachenyludazine 1.3-Entalorobenzene 1.3-Entalorobenzene 1.4-Drachlorobenzene 1.4-Drachlorobenzene 1.4-Drachlorobenzene 2.2,4,6-Tetrachloropene) 2.3,4,6-Tetrachlorophenol 2.4,6-Tetrachlorophenol 2.4,6-Trachlorophenol 2.4,6-Trachlorophenol 2.4,6-Trachlorophenol 2.4,6-Trachlorophenol				7.75.514				1, 2, 4, 5-Tetrachlorobenzene	200 ug/mL
1.2-Dichlorobensere 1.2-Dichlorobensere 1.3-Dichlorobensere 1.3-Dichlorobensere 1.4-Dichlorobensere 1.4-Dichlorobensere 2.7-coxfre 1.3-Dickloropensere 2.7-coxfre 2.3-4.6-Tetrachloropens 2.4,5-Tetrachloropens 2.4,5-Tetrachlorophenol 2.4,6-Tetrachlorophenol 2.4,6-Tetrachlorophenol 2.4-Dichlorophenol								1,2,4-Truchlorobenzene	200 ug/mL
1.2-Diphenylhydiazine 1.3-Euchlorobenzene 1.3-Euchlorobenzene 1.4-Euchlorobenzene 1.4-Euchlorobenzene 1.4-Euchlorobenzene 2.2'-coxybisell-chloropropane) 2.3,4'-6-Tetrachlorophenol 2,4,6-Tetrachlorophenol 2,4,6-Tetrachlorophenol 2,4,6-Tetrachlorophenol 2,4,6-Tetrachlorophenol								I.2-Dichlosobenzene	200 uq/mL
1.3-Dichlorobenzene 1.4-Dichlorobenzene 1.4-Dichlorobenzene 1.4-Dichlorobenzene 1.4-Dichloropenzene 1.4-Dichloropenzene 2.2'-coxybasil-chloropense 2.3,4'-6-Tetrachlorophenol 2,4,6-Tetrachlorophenol 2,4,6-Tetrachlorophenol 2,4-Dichlorophenol								1, 2-Diphenylhydrazine	200 ug/mL
1.3-Dunitobenzene 1.4-Duoxane 1.4-Duoxane 1.3-Euroxane 2.1-Control 2.3-4-Duoxane 2.4,5-Truchlorophenol 2.4,6-Truchlorophenol 2.4,6-Truchlorophenol 2.4,6-Truchlorophenol								1, 3-Dichlorobenzene	200 ng/mL
1.4-Duchlorobensene 1.4-Ducklydnaphtalene 2.2.4-oxybisil-chloropropane) 2.9.4-6-Tetrachlorophenol 2.4,6-Tetrachlorophenol 2.4-buchlorophenol								1,3-Dinitrobenzene	200 ug/mL
1.4-Dioxane I-Methylaphthalene 2.2 '-oxybisil-chloropropane 2.3,4,6-Tetrachloropheno 2.4,5-Tetrachloropheno 2.4,6-Tetrachloropheno 2.4,6-Tetrachloropheno 3.4-Dichloropheno								1,4-Dichlorobenzene	200 ug/mL
1. Methyinaphthalene 2. 2. 4. Oxylsil-chloroptopahe) 2. 3. 4. 6-Tetrachlorophenol 2. 4. 5-Trichlorophenol 2. 4. 6-Trichlorophenol 2. 4 - Dichlorophenol								1,4-Dioxane	200 ng/mL
2.3'-cxybis[l-chloropropane] 2.3,4'-f-Terrachloropheno] 2.4,5-Trichloropheno] 2.4,5-Trichloropheno] 2.4-Dichloropheno]								I-Methylnaphthalene	200 ug/mL
2.3,4,6-Tetrachlorophenol 2.4,5-Tetachlorophenol 2,4,6-Tetachlorophenol 2,4-Dichlorophenol								2.2 '-oxvbis 1-chloropropane]	200 ng/mL
2.4,5-Trinhlorophenol 2.4,6-Trichlorophenol 2,4-Dichlorophenol								2,3,4,6-Tetrachlorophenol	200 ug/mL
2,4,6-Trichlorophenol 2,4-Dichlorophenol								2,4,5-Trichlorophenol	200 ug/mL
2,4-Dichlorophenol								2,4,6-Trichlorophenol	200 ug/mL
								2,4-Dichlorophenol	700 nd/mr
									1.000

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 48D-89467-1

			a	Headent	Parent Reagent			
Reagent ID	EMP	Prep	Dilutant F. Dised Vo	Final	Reagent ID	Volume	Analyte	Concentration
							Hexachlorobutadiene	200 ug/mt
							Hexachlorocyclopentadiene	200 ng/mb
							Hexachlorosthane	200 ug/mL
							Hegadecane	200 ng/mL
							Indens[1, 2, 3-cd]pyrene	200 ug/mL
							Isophorone	200 ng/mt.
							n-Decane	200 wg/mL
							N-Nitrosodi-n-propylamine	200 ud/mL
							N-Nitrosodimethylamine	
							N-W Francodinhapol amina	Jana novel
							1-Octadecase	250 ng/mL
							Naphthalene	200 ud/mL
							Nitrobenzene	200 ug/mL
							Pentachlorophenol	400 uq/mL
							Phenanthrene	200 ug/mL
				_			Phenol	200 ng/mL
							Pyrene	200 ug/mL
							Pyridine	200 ug/mt
				MB	MR LISIG STR 90002	1000 np	Benzoic acid	200 ud/mL
)		_	200 ng/mL
				MB	MB L1S11 STK 00002	1000 nr	Atracine	200 ng/mL
								200 ug/mL
					A STATE OF THE PARTY OF THE PAR		_	200 ng/mt
				MB	MB L1SS STK 00002	IN GOOT	-	200 ng/mL
							-	200 ug/mL
				MB	MB SURR STK 00042	400 ul	2, 4, 6-Tribromophenol	200 ug/mt.
							2-Fluorobiphenyl	200 ug/mL
							2-Fluorophenol	200 ng/mL
								200 ug/mL
							p-Terphenyl-dl4 (Surr)	200 ug/mL
							Phenol-d5	200 ng/mr
MB LISI STE 00023	13/31/16		Rester, Lot A0111934		(Furchased Reagent)	nt)	I, 1 -Biphenyi	1000 ng/mL
							1,2,4,5-Tetrachlorobenzene	1000 ng/mF
							1, 2, 4-Trichlorobenzene	1000 ug/mL
							1,3-Dichlorobensene	1000 ng/mr
							1, 2-Diphenyihydrazine	loog ng/mr
							1,3-Dichlerobenzene	1000 ug/mL
							I, 3-Dinitrobensene	1000 ug/mL
							1,4 Dichlorobenzene	1000 ug/mL
							1,4-Diowane	1000 ng/mt
							1-MethyInaphthalene	1000 wg/mL
							2,2 -oxybis[1-chloropropane]	1000 ng/mL
							2, 3, 4, 6-Tetrachlorophenol	1000 ug/mL
							2,4,5-Trichlorophenol	1000 ug/mL
							2,4,6-Trichlorophenol	1000 ug/mL
							2,4-Dichlerophenol	1000 ug/mt
							2,4-Dimethylphenol	1000 ug/mL
							The second secon	AAAA

11/13/2015

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1-19066

Job No.: 480-89	
Buffalo	
TestAmerica	
Lab Name:	

				Readent	Patent Readent			
	EXT	Prep	Dilutant	Final	Readent In	Volume	Analyte	Concentration
ATT TOTAL		2000	3	A CONTRACTOR OF THE PARTY OF TH	art arradiance	Name of	3 A-Dinierorollusus	\$000 pa/mt
	i						2.6-Dicklorophenol	1000 ng/mt.
							9.6-Dinitrotoluene	1000 na/ml.
							2-chlorenaphthalene	1990 un/ml
							2-Chlorophenol	1000 ug/mL
							2-Methylnaphthalene	1000 ng/mL
							2-Methylphenol	1000 Mg/mL
							2-Nitroaniline	1000 ud/mL
							2-Nitrophenol	1000 ng/mL
							3-Nitroaniline	1000 ug/mL
							4.6-Dimitro-2-methylphenol	2550 ug/mL
							4-Bromonhanvl phenvl ether	
							4-Chloro-3-methylphenol	3000 ng/mL
							4-Chlorogniline	1000 ng/mL
							4-Chierophenyl phenyl ether	1000 ng/ml.
							A Mother Phone 1	Taryon poor
							4-Methylphenol	TOOO BELL
							4-Nithognaline	1000 ug/mL
							4-Nitrophenol	2000 uq/mL
							Acenaohthene	1000 uc/mL
							Prenamhthylene	1000 no/ml.
							Acenaphenytene	TOTAL OF THE
							Acetophenone	1000 ng/mL
							Aniline	1000 ug/mL
							Anthracene	1000 ng/mt
							phenotopic	TOOK MAKE
							Acodemicano	2000 000
							Benzolajantniacene	1000 ug/mL
							Benso[a]pyrene	1000 ug/mt
							Benzo[b]fluoranthene	1000 ug/mL
							Benzola, h, il berylene	1500 ug/mL
							Ranzofelfineranthane	1000 waynt.
							Design of the party of the part	Total Control
							Denzy a contra	1000 ng/m
							BIS (2-CIT OF OWN HOUSE) AND CHARLE	THE PROPERTY OF THE PARTY OF TH
							bisic-chronoennyllether	TONO ESTIME
							Bis(2-ethylhexyl) phthalate	1000 ng/mF
							Buryl Denzyl phthalate	TOOM NG/ME
							Carbazole	1000 ng/mL
							Chrysene	1000 ng/mr
							Di-n-butyl phthalate	Im/gu 0001
							Di-n-octvl phthalate	1000 ud/mL
							Dibengla, hyanthracene	1000 ua/mL
							Dibenzoforan	1000 ng/mt
							Disebyl phthalata	1000 we/mt.
							Discoult Parkettalland	100 mg/m1
							Dieterny president	THE PART OF THE
							Diphenylanine	TITO BELLE
							Fluoranthene	1000 ng/mL
							Fluorene	IOOO nd/mr
							Hexachlorobenzene	1000 wg/mt
							Hexachlorobutadiene	1000 ug/mL
							Makagari angaral angarangan	TOOU WOYNE.

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

				trenest	Parent Readent	23		
Reayent ID	EMD	Prep	Dilutant	Final	Reagent ID	Volume Added	Analyte	Concentration
							Hexachloroethane	3000 ug/mt
							Hexadecane	1000 ug/mL
							Indeno[1, 2, 3-cd]pyrene	1000 ng/mL
							Isophorone	1000 ug/mL
							n-Decane	1000 ug/mL
							N-Nitrosodi-n-propylamine	1000 ng/mL
							N-Nitrosodimethylamine	1000 ng/mL
							N-Nitrosodiphenylamine	2000 ug/mL
							n-Octadecane	1000 ug/mL
							Naphthalene	1000 ug/mL
							Nitrobenzene	1000 ng/mF
							Pentachlocophenol	2000 ng/mt
							Phenanthrene	1000 ng/mL
							Phenol	1000 ug/mL
							Pyrene	1000 ng/mL
							Pyridine	1000 ng/mL
.MB LISIO STK 00002	08/31/16		Rester, Lot A0108988		(Eurphased Reagent)	ent)	Benzolc acid	2000 ug/mL
							Indene	2000 ug/mL
ME LISII STK 00002	08/31/16		Rektek, Lot AUIDH989		(Thirthased Reagent)	ent)	Atrazine	2000 nd/mr
							Benzaldehyde	2000 ug/mL
							Caprolactam	2000 ng/mL
.ME LISS STK DODGS	01/33/16		Rester, Lot A0110231		(Purchased Reagent)	ent)	3,3"-Dichlorobenzidine	2000 ug/mL
The state of the s					AND ADDRESS OF THE PARTY OF		Benzidine	2000 ng/mt
ME SURE STE DODAS	01/IS/18		Restek, Lot AC92712		(Furchased Reagent)	ent)	2,4,6-Tribromophenol	5000 ng/mL
							2-Finorobiphenyi	
							2-Fluorophenol	5000 ug/mt
							Nicrobenzene-dS (Surr)	5000 ng/mL
							p-Terphenyl-dl4 (Surr)	2000 ng/mL
							Phenol-d5	5000 ug/mL
S LILVI WRK 00115	03/21/16	6 10/07/15	Wethylene Chloride, Lot		TO ML MB Listl INF 00021	200 ul.	I.IBiphenyl	4 ng/mr
			118685				1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
							1 to Almer the continuous	4 nd/mm
							1 2 Dick confidences	Total Service A
							Tr. C. Tr. Control Control Control	
							1,2-Diphenyinydrazine	
							1,3-Dishiolopenzene	
							1,3-Dinicrobenzene	
							1,4-pregrocommen	
							1,4-blosane	
							1-nernymagningtene	700 / 500 E
							2,2 -oxybis[1-chloropropane]	
							2,3,4,6-Tetrachlorophenol	4 ng/mr
							2,4,5-Trichlorophenol	4 rd/mr
							2,4,6-Trichlorophenol	4 ng/mr
							2,4-DLCDLOZOphenol	4 ng/mr
							3,4 -ulmetnylphenol	TW/Dn &
							2.4-Dimitrophenol	8 ag/mL
							2,4-Dinitiotolnene	a ng/mt
				Dane 08 of 306	F 3.26			4414312045
				200	070			2010

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

Volume Reagent ID

Jap No.: 480-89467-1

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Burralo	
restAmerica	
Namer	No.:
Lab	SDG

Seeport ID Take Digital Stand Wolume Seeport ID Wolume Seeport ID Wolume Seeport ID See					4 may as per as All	Patent Reagent	225		
However can be seen as a second can be seen as a sec	Reapent ID	Exp	Prep	Dilutant	Final	Reagent ID	Volume	Analyte	Concentration
Tideling Tideling									A working
The state of the s								The state of the s	
Page 100 of 326 Page 100 o								Indencit, f, 3-og pyrene	4 ng/mr
William Wilder								Targhtin Lotte	- 1
10 10 10 10 10 10 10 10								M. We're not cold among among	-1
1971/15 198/21								N-Natrocodimethylamine	A War/mit.
								At at the second will be seen as a second	Total Carlot
								N-N-LUSSCAIDHEHATAMINE	JIII / 500 0
Wighthisters		_						n-CotadeCane	4 ug/mr
Wit cohomeches Physics Physi								Naphthalene	4 ng/mt
### Series of the control of the con								Nitrohenzene	4 ug/mL
### ### ##############################								Fentachlorophenol	8 ng/mF
### Piperol Pi								Phenanthrene	4 very mt
Pictoria Pictoria								Dhanol	A noting.
110 110								Division	Total A
### ### ##############################								Pyrelle Promise	and and a
### ### ##############################								Wildine	4 nd/mr
D7/31/16 D9/21/15 Dethylene Chloride, Lor 10 mL MB_L142_STN 00023 2000 uL 1. T. Extractorement 1. S.								Benzoic acid	Jm/Sn &
Main Main								Indene	4 mg/mg
Description Description								Atrazine	4 ng/mr
O7/31/15 Wetbylene Chlotide, Lot 10 mL 12 mm 12 mm 12 mm 13 mm 14 mm								Benzaldehyde	4 uct/mL
97/31/15 09/21/15 techylene Chloride, Lot 10 mL Ms_LASI_STX 20003								Caprolactan	4 ng/mL
17/31/15 09/21/15 19 mL MB_LASI_STR 00023 2-6 - Tailor to the template of the template o								2 2'-Tichloroheneldine	A MANUEL
07/31/15 Ge/31/15 Hethylene Chloride, Lot for the LASI_STR 200023 COO ut 1.1.* Chronesee-ds (Surrible of Surrible								an interpretation of the	A RGV III.
07/31/15 Wethylene Chloride, Lot 10 mt. MB_LASI_STR_00023 2000 ut. 1.1-16. plentylene Chloride, Lot 10 mt. MB_LASI_STR_00023 2000 ut. 1.1-16. plentylene Chloride and 1.2-4-Tritchlerebarse 1.2-4-Tritchlerebarse 1.3-10. chloropense 1.3-10. chlorope								benziolne	4 Mg/mr
2-Filotophenol								2,4,6-Tribremephenol	A ng/mt
2-25uocquemon Mirobenseen-d5 Suuri P-5sybenji-di4 (Suri) P-7sybenji-di4 (Suri) Suria (Sur								2-Sluorobiphenyl	4 Mg/mL
Mirobensens-d5 (Surr)								2-Fluorophenol	4 ug/mL
10								Mitrobensene-d5 (Surr)	4 ng/mr
118665								n-Ternhenvl-dif (Surr)	4 ng/mr
07/31/16 Wethyler Chloride, Lot 10 mL MB LASI_STW 20023 2000 ut 1.1"-Exphenyl 1.2.4.5—Terrachlorobenzene 1.2.4—Terrachlorobenzene 1.2.4—Terrachlorobenzene 1.3.1—Terrachlorobenzene 1.3.1—Terrachlorobenzene 1.3.1—Terrachlorobenzene 1.3.1—Terrachlorobenzene 1.3.1—Terrachlorobenzene 1.3.1—Terrachlorobenzene 1.3.1—Terrachlorobenzene 1.3.1—Terrachlorobenzene 1.4.3—Terrachloropenzene 1.4.1—Terrachloropenzene 1.4.1 Page 100 of 326									A nor/ml.
1.2.4, 5. Terrachiorobenzene 1.2.4 - Tritchlorobenzene 1.2.7 - Terrachiorobenzene 1.3.7 - Terrachiorobenzene 1.3.7 - Terrachiorobenzene 1.3.7 - Terrachiorobenzene 1.4.7 - Terrachiorobenzene 1.4.7 - Terrachiorobenzene 1.4.7 - Terrachioropenzene 1.4.7 - Terrachioropenzene 1.4.7 - Terrachioropenzene 1.4.5 - Terrachioropenzene 1.4.5 - Terrachiorophenol 2.4 - Terrachiorophenol 2.4 - Terrachiorophenol 2.4 - Terrachiorophenol 2.4 - Terrachiorophenol 2.4 - Terrachiorophenol 2.4 - Terrachiorophenol 2.4 - Terrachiorophenol 2.4 - Terrachiorophenol 2.4 - Terrachiorophenol 2.4 - Terrachiorophenol 2.4 - Terrachiorophenol 2.4 - Terrachiorophenol 2.5 - Terrachiorophenol 2.6 - Terrachiorophenol 2.7 - Terrachiorophenol 2.7 - Terrachiorophenol 2.7 - Terrachiorophenol 2.7 - Terrachiorophenol 2.7 - Terrachiorophenol 2.7 - Terrachiorophenol	.MB ListE INT 00021	07/31/16	+			ME LIST STK D0023	2000 ut	-	200 ug/mL
12,4,5-Tetrachlotobersee 1,2,4-Trichlotobersee 1,2,4-Trichlotobersee 1,3-Thichlotobersee 1,3-Thirtobersee 1,4-Thirtobersee 1,4-Thirtobersee 1,4-Thirtobersee 1,4-Thirtobersee 2,2owybis[1-chlotopropane] 2,3,4,6-Tetrachlorophenol 2,4-Grid notophenol 2,4-Grid notophenol 2,4-Thirtophenol			_			l l		_	
12.4-TrichAcrobenzene 1.5-DrichBergilwiterzine 1.3-DrichBergilwiterzine 1.3-DrichBergilwiterzine 1.3-DrichBergilwiterzene 1.3-DrichBergene 1.4-Drochenzene 1.4-Drochenzene 1.4-Drochenzene 2.5-Oovybis[1-chloropropiane] 2.3,4,6-Tettachlorophenol 2.4,6-Tettachlorophenol 2.4,6-Tettachlorophenol 2.4-DrichBergenenl 2.4-DrichBergenenl 2.4-DrichBergenenl 2.4-DrichBergenenl 2.4-DrichBergenenl 2.4-DrichBergenenl 2.4-DrichBergenenl 2.4-DrichBergenenl 2.5-DrichBergenenl 2.5-DrichBergenenl 3.6-DrichBergenenl 3.6-DrichBergenenl 3.6-DrichBergenenl 3.6-DrichBergenenl 3.6-DrichBergenenl								1,2,4,5-Tetrachlorobenzene	200 ug/mL
1.2-Dichlorobenzene 1.2-Dichlorobenzene 1.3-Dinchlorobenzene 1.4-Dinchlorobenzene 1.4-Dinchlorobenzene 1.4-Dichlorobenzene 1.4-Dichloropenzene 2.2-oxybisi-chloropenzel 2.3-3-G-Trachloropenzel 2.3-G-Trachloropenzel 2.4-Dichloropenzel 3.4-Dichloropenzel 3.4-Dichloropenzel 3.4-Dichloropenzel 3.4-Dinchloropenzel								I, 2, 4-Trichlorobenzene	200 ug/mL
1.3-nuphenyihydrazine 1.7-nularizobenzene 1.7-nularizobenzene 1.4-nularizobenzene 1.4-nularizobenzene 1.4-nularizobenzene 1.4-nularizobenzene 2.2oovybisil-chloropropane) 2.3-4-0-retrachiorophenol 2.4-0-risohlorophenol								1,2-Dichlorobenzene	200 ug/mL
13-Dichlorobensene 1,3-Dinitrobensene 1,4-Dichlorobensene 1,4-Dichlorobensene 1,4-Dichloropensene 2,2-oxybis[1-chloropene] 2,4,6-Tetachlorophenol 2,4,6-Tetachlorophenol 2,4,5-Tichlorophenol 2,4-Dichlorophenol 2,4-Dichlorophenol 2,4-Dichlorophenol 2,4-Dichlorophenol 2,4-Dichlorophenol 2,4-Dichlorophenol 2,4-Dichlorophenol 2,4-Dichlorophenol 2,6-Dichlorophenol 2,6-Dichlorophenol								1, 3-Diphenyihydrazine	200 ag/mL
1.3-Dinitrobensere 1.4-Dinosene 1.4-Dinosene 1.4-Dinosene 1.5-Conditionaliste 2.5-Conditionaliste 2.5-Conditionaliste 2.4-S-Trachlorophenol 2.4-S-Trachlorophenol 2.4-Dinditophenol 2.4-Dinditophenol 2.4-Dinditophenol 2.4-Dinditophenol 2.5-Dinditophenol 3.5-Dinditophenol 3.5-Dinditophenol 3.5-Dinditophenol 3.6-Dinditophenol 3.6-Dinditophenol								1, 3-Dichlorobenzene	200 ug/mL
1,4-Dichlorobencene 1,4-Dickne 1.4-Dickne 1.4-Dickne 1.5,4-G-Tetrachlorophenol 2,5,4-G-Tetrachlorophenol 2,4-G-Tetrachlorophenol 2,4-G-Tetrachlorophenol 2,4-Dichlorophenol								1,3-Dinitrobensene	200 ug/mL
1.4-Dioxane 1.4-Dioxane 2.5-Signification of properties 2.5-Signification of properties 2.5-Signification of properties 2.4-Signification of properties 2.4-Signification of properties 2.4-Dioxing properties 2.4-Dioxing properties 2.4-Dinition of properties 2.4-Dinition of properties 2.4-Dinition of properties 3.6-Dichiological of properties 3.6-Dichiological of properties 3.6-Dichiological of properties 3.6-Dichiological of properties 3.6-Dichiological of properties 3.6-Dichiological of properties 3.6-Dichiological of properties 3.6-Dichiological of properties 3.6-Dichiological of properties 3.6-Dichiological of properties 3.6-Dichiological of properties 3.6-Dichiological of properties 3.7-Dichiological of properties 3.6-Dichiological of properties 3.7-Dichiological of properties 3.6-Dichiological of properties 3.7-Dichiological of properties 3.7-Dic								1.4-Dichlorobenzene	200 ng/mL
1-Methylnaphthalene 2. 2coopbig L-chloropropiane] 2. 3. 4. 5-Tri chloropropiano] 2. 4. 5-Tri chloropropiano] 2. 4. 5-Tri chloropropiano] 2. 4. 5-Tri chloropropiano] 2. 4. 5. Tri chloropropiano] 2. 4. 5. Tri chloropropiano] 2. 4. 5. Tri chloropropiano] 3. 4. 5. Tri chloropropiano] 3. 4. 5. 5. 5. 5. 5. 5. 5. 5. 5. 5. 5. 5. 5.								1.4-Dioxane	200 ug/mL
2,2-oxybis[1-chloropropane] 2,3,4,6-Tetrachloropheno] 2,4,5-Tetchloropheno] 2,4-Drachoropheno] 2,4-Drachoropheno] 2,4-Drachoropheno] 2,4-Drachoropheno] 2,4-Drachoropheno] 2,4-Drachoropheno] 3,4-Drachoropheno] 3,4-Drachoropheno] 3,4-Drachoropheno] 3,6-Drachoropheno] 3,6-Drachoropheno]								1-Methylnaphthalene	260 ng/mL
2,3,4,6,0-Tetrachiorogeneral 2,4,6-Tetrachiorogeneral 2,4,6-Tetrachiorogeneral 2,4-Dirachiorogeneral 2,4-Diractive phenol 2,4-Diractive phenol 2,4-Diractive calence 2,6-Diractive college 2,6-Diractive college 3,6-Diractive college 4,6-Diractive college 4,6-Diracti								2.2 - cowhistlachlorestanel	200 werking
2.4.5-Trachicophenol 2.4.5-Trachicophenol 2.4-Trachicophenol 2.4-Timerhylphenol 2.4-Timerhylphenol 2.4-Timerhylphenol 2.4-Timerhylphenol 2.4-Timerhylphenol 2.5-Timerhylphenol 3.6-Timerhylphenol 3.6-Timerhylphenol								o a A G-Tetrach Concepton	Tal water
2.4.5-Trinchlorophenou 2.4-Dichlorophenou 2.4-Dichlorophenou 2.4-Dinthrophenou 2.4-Dintrophenou 2.4-Dintrophenou 2.6-Dichlorophenou 3.6-Dichlorophenou								A A STATE OF THE S	THE WAY WAY
2.4-70. it is it is a composition of 2.4-70. it is a composition of 2.4-0. it is a composition o								2 4 Commission of Commission	THIS WAYNE
2.4 - Olimin Oroganion 2.4 - Olimin Oroganion 2.4 - Olimin Expheriol 2.4 - Olimin Trocoherrol 2.6 - Olimin Oroganion 1.7/7								A T TO THE COURT OF COMMERCE	The source of
2.4 - Titute CLy byte for 1.2.4 - Titute CLy berout 2.4 - Clinit Erot clueme 2.5.6 - Clichic or other out								7.4-DICUIODDENOT	200 Rg/mL
2,4-Dinitrophenol 2,4-Dinitrocohene 2,6-Dichiorophenol 1,7/7								2,4-Dimerny-phenol	THIS DOZ
2.4-Ointrocoluene 2,6-Dichlorophenol								2,4-Dinitrophenol	400 ug/mL
2, 6-Dichlosophenol								2,4-Dinitrotolneme	200 ng/mL
								2, 6-Dichlorophenol	200 ng/mp
					Or own	2000			4500,000
					Lage 100	0.000			1113/2013

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

REAGENT TRACEABILITY SUMMARY

Concentration

Lab Name: TestAmerica Buffalo Job No.: 480-89467-1

SDG No.:

Rester, Lot A0111934 Rester, Let A011934 Rester, Let A011934 Rester, Let A0111934 Rester, Let A011934 Rester, Let A0111934 Rester, Let A011934 Rester, Let A011934 Rester, Let A011934 Rester, Let Rester, Re
KB_L1S10_STK_D0002
KB_L1810_STK_00002 1000 uk KB_L181_STK_00002 1000 uk KB_SURA_FTK_00002 1000 uk KB_SURA_FTK_00042 400 uk
MB_L1S10_STK_00002 1000 uL MB_L1S9_STK_00002 1000 uL MB_SURR_STK_00042 400 uL (Eurchased Reagent)
KB_L1S1G_STK_00002
MB_LISS_STK_00002 1000 uL MB_LISS_STK_00002 1000 uL MB_SURA_STK_00042 400 uL (Purchased Reagent)
MB_LISS_STK_00002 1000 uL
MB_SURR_STK_OD042 1000 ul. MB_SURR_STK_OD042 400 ul.
MB_SURR_FIR_UD042 400 ul
(Purchased Reagent)
(Purchased Reagent)
(Furchased Reagent)
1.2, 4 The chlorobenzene 1.2 - 0.1 phenyllydissine 1.3 - 0.1 phenyllydissine 1.3 - 0.1 phenyllydissine 1.4 - 0.1 chlorobenzene 1.4 - 0.1 chlorobenzene 1.4 - 0.1 chlorobenzene 1.4 - 0.1 chloropenzene 2.2, 4 - 0.1 chloropenol 2.3, 4 - 0.7 etrachioropenol 2.4, 5 - Trichiorophenol 2.4 - 0.1 chlorophenol 2.5 - 0.1 chlorophenol 2.5 - 0.1 chlorophenol 2.6 - 0.1 chlorophenol 2.6 - 0.1 chlorophenol 2.6 - 0.1 chlorophenol 2.7 - 0.1 chlorophenol 2.7 - 0.1 chlorophenol 2.7 - 0.1 chlorophenol 2.7 - 0.1 chlorophenol 2.7 - 0.1 chlorophenol 2.7 - 0.1 chlorophenol 2.7 - 0.1 chlorophenol 2.7 - 0.1 chlorophenol
1,2-Diphenyihydrazine 1,3-Diribhenyihydrazine 1,3-Diribhobenzene 1,4-Diribhobenzene 1,4-Diribhobenzene 1,4-Diribhobenzene 2,2-0xybisfi-chloropropar 2,3-4,6-Terradioropropar 2,4-6-Terradioroprenol 2,4-6-Terradiorophenol 2,4-6-Terradiorophenol 2,4-Direchylphenol 2,4-Direchylphenol 2,4-Direchylphenol 2,4-Direchylphenol 2,4-Diribhophenol 2,4-Diribhophenol 2,6-Diribhophenol
1,4 -0 total acceptance 1 1,4 -0 total acceptance 1 1,4 -0 total acceptance 1 1,4 -0 total acceptance 1 1,4 -0 total acceptance 1 1,4 -0 total acceptance 1 2,2 -0 acceptance 1 2,3 -0 total acceptance 1 2,4 -0 total acceptance 1 2,4 -0 total acceptance 1 2,4 -0 total acceptance 1 2,4 -0 total acceptance 1 2,4 -0 total acceptance 1 2,4 -0 total acceptance 1 2,5 -0 total acceptance
1,4-Dichlocobengene 1,4-Dichlocobengene 1,4-Dichlocopene 1,4-Dichlocopene 2,2-coxybisfi-chlocopropa 2,3-6-frichlocophenol 2,4,6-frichlocophenol 2,4-Dichlocophenol 2,4-Dichlocophenol 2,4-Dintrophenol 2,4-Dintrophenol 2,4-Dintrophenol 2,4-Dintrophenol 2,5-Dintrophenol 2,5-Dintrophenol 2,6-Dintrophenol 2,6-Dintrophenol 2,6-Dintrophenol 2,6-Dintrophenol 2,6-Dintrophenol 2,6-Dintrophenol 2,6-Dintrophenol 2,6-Dintrophenol 2,6-Dintrophenol
1-Methylnaphthalene 8.2 -osybisfir-chloropropan 2.3 4,6-Tetrachlorophenol 2.4,6-Tetablorophenol 2.4,6-Tetablorophenol 2.4-Dinablorophenol 2.4-Dinablorophenol 2.4-Dinablorophenol 2.4-Dinablorophenol 2.4-Dinablorophenol 2.5-Dinablorophenol 2.5-Dinablorophenol 3.5-Dinablorophenol 3.5-Dinablorophenol 3.5-Dinablorophenol
2.2%-osybisf[=-chloropropan] 2.34,6~Tetachloropropan] 2.4.6~Tetahlorophenol 2.4.6~Tetahlorophenol 2.4.6~Tetahlorophenol 2.4.6.Dinitrophenol 2.4.5.Dinitrophenol 2.4.5.Dinitrophenol 2.4.5.Dinitrophenol 2.5.5.Dinitrophenol 2.6.5.Dinitrophenol 2.6.5.Dinitrophenol 2.6.5.Dinitrophenol
2, 3, 4 s "fettachlorephenol 2, 4, 5-Trischlorephenol 2, 4-Ortichlorephenol 2, 4-Ortichlorephenol 2, 4-Ortitrophenol 2, 4-Ortitrophenol 2, 5-Ortitrophenol 2, 5-Ortitrophenol
2.4.6-Teleforephenol 2.4-Director prophenol 2.4-Director phenol 2.4-Director phenol 2.4-Director phenol 2.4-Director cluence 2.5-Director phenol 2.6-Director phenol 2.6-Director phenol 2.6-Director phenol
2,4-Dirchlorophenol 2,4-Dinethylphenol 2,4-Dinitrophenol 2,4-Dinitrophenol 2,5-Dinitrophenol 2,5-Dinitrophenol 2,5-Dinitrophenol 3,5-Dinitrophenol
2,4-Dinethylphenol 2,4-Dinitrophenol 2,4-Dinitrophenol 2,6-Dinitrophenol 2,6-Dinitrophenol 3,6-Dinitrophenol
2,4-Dinitrophenol 2,4-Dinitrophenol 2,4-Dinitrophenol 2,6-Dinitrophenol 2,6-Dinitrophenol
2,6-51431 topophenol
2,6-Dinitrotoluene

200 Hg/mL

11/13/2015

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Jap No.: 48D-89467-1 Lab Name: TestAmerica Buffalo

Date Date Date Date	ENG			4 a concept	Pacent Reagent	e.		
2.400,000,000,000,000,000,000,000,000,000	2 **PCDA_CORPUS_A_T 1000 2 **REDA_CORPUS_A_T 1000 2 **RECA_CORPUS_A_T 1000 3 **RECA_CORPUS_A_T 1000 4 *RECA_CORPUS_A_T 1000 5 *RECA_CORPUS_A_T 1000 6 *RECA_CORPUS_A_T 1000 7 *RECA_CORPUS_A_T 1000 8 *RECA_CORPUS_A_T 1000 8 *RECA_CORPUS_A_T 1000 8 *RECA_CORPUS_A_T 1000 8 *RECA_CORPUS_A_T 1000 8 *RECA_CORPUS_A_T 1000 8 *RECA_CORPUS_A_T 1000 8 *RECA_CORPUS_A_T 1000 8 *RECA_CORPUS_A_T 1000 8 *RECA_CORPUS_A_T 1000 9 *RECA_CORPUS_A_T 1000 100	Prep	Dilutant	Final	Reagent ID	Volume Added	Analyte	Concentration
1000 1000 1000 1000 1000 1000 1000 100	2-Methylnaphthalene						2-Chlorophenel	3000 ug/mt
1000 1000	2-Netbylphenol						2-Methylnaphthalene	1000 ug/mL
1000 1000 1000 1000 1000 1000 1000 100	2-Nitroaniline						2-Methylphenol	1000 ng/mL
2000 2000 2000 1000 1000 1000 1000 1000	2-Nitrophenol. 3-Nitroanline 4,6-Lultic-2-wethylphenol. 4,6-Lultic-2-wethylphenol. 4-Chloroshiline 4-Chloroshiline 4-Chloroshiline 1000 4-Chloroshiline 1000 4-Nitroanline 1000 4-Nitroanline 1000 Aceraphenole Aceraphenole 1000 Aceraphithene 1000 Aceraphithylene 1000 Aceraphithylene 1000 Aceraphithylene 1000 Aceraphithylene 1000 Benzo[alpyrene 1						3-W-17-0an-14-ba	1000 no/m1.
2000 1000 1000 1000 1000 1000 1000 1000	3.21 1.00 3.22 1.00 4.00 4.00 1.00 4.00 4.00 1.00 4.00 4.00 1.00 4.00 4.00 1.00 4.00 4.00 1.00 4.00 4.00 1.00 4.00 4.00 1.00 4.00 4.00 1.00 4.00 4.00 1.00 4.00 4.00 1.00 4.00 4.00 1.00 4.00 4.00 1.00 5.00 4.00 1.00 6.00 4.00 1.00 6.00 6.00 1.00 6.00 1.00 1.00 7.00 1.00 1.00 7.00 1.00 1.00 7.00 1.00 1.00 7.00 1.00 1.00 7.00 1.00 1.00 7.00 1.00 1.00 7.00 1.00 1.00 7.00 1.00 1.00 7.00 1.00 1.00 7.00 1.00 1.00 7.00 1.00						3-Withouthanal	3000 ver/ml.
2000 1000 1000 1000 1000 1000 1000 1000	4.6 - Note to be a control of						A.Wattacher John	SAMO WAYOUT
1000 1000 1000 1000 1000 1000 1000 100	4-Eromochenyl phenyl ether 1,000 4-Chloro-3-methylphenol 1,000 4-Chloro-3-methylphenol 1,000 4-Chloro-phenyl phenyl ether 1,000 4-Mitroghienol 1,000 4-Mitroghienol 1,000 4-Mitroghienol 1,000 4-Mitroghienol 1,000 4-Mitroghienol 1,000 4-Mitroghienol 1,000 Achagubthene 1,000 Achagubthene 1,000 Benzo[alpurene 1,000 Benzo[A C. Trivella no. D. machinella theman	Total Social
1000 1000 1000 1000 1000 1000 1000 100	4-Chiorceniline 1000 4-Chiorceniline 1000 4-Chiorceniline 1000 4-Chiorceniline 1000 4-Chiorceniline 1000 4-Methylphenoi 1000 5-Methylphenoi 1000 5-Methylphenoi 1000 6-Metoghenone 1000 6-Metoghenone 1000 6-Metoghenone 1000 6-Metoghenone 1000 6-Metoghenone 1000 6-Metoghenone 1000 6-Metoghenoi 1000 7-Metoghenoi						4, 6 TILLELOT TOTAL TOTAL	THE CO. 12
1000 1000 1000 1000 1000 1000 1000 100	4-Chloroshiline 4-Chloroshiline 4-Chloroshiline 4-Chloroshiline 4-Chloroshiline 4-Chloroshiline 4-Wittoshiline 4-Wittoshiline 4-Wittoshiline 4-Wittoshiline 4-Wittoshiline 5-Wittoshiline 6-Wittoshiline						4-Bromophenyl phenyl ether	1000 ng/mr
1000 1000 1000 1000 1000 1000 1000 100	4-Chlotoenilite						4-chloro-3-methylphenol	1000 ng/mL
1000 1000 1000 1000 1000 1000 1000 100	4-Chlorophenyl phenyl ether 1000 4-Nethylphenyl 1000 4-Nitrophenyl 1000 4-Nitrophenyl 1000 5-Chapbhthylene 1000 6-Chapbhthylene 1000 6-Chapbhthyl						4-Chloroaniline	1000 ug/mL
2000 2000 2000 2000 2000 1000 1000 1000	4-Nethylphenol						3-Chlorophenyl phenyl ather	1990 sa/ml.
2000 1000 1000 1000 1000 1000 1000 1000	ANITOCALLIANE ANITOCALLIANE ANITOCALLIANE ACCEPTATIONE ACCEPTATIONE ACCEPTATIONE ACCEPTATIONE ACCEPTATIONE ANITOCALLIANE ANITOCALLIANE ANITOCALLIANE ANITOCALLIANE BENZO[2] ALTOCATATIONE BENZO[2] ALTOCATATIONE BENZO[2] ALTOCATATIONE BENZO[2] ALTOCATATIONE BENZO[2] ALTOCATATIONE BENZO[2] ALTOCATATIONE BIS[2-chlorocaty] ether BIS[2-chlorocaty]						d weather deviced the property of the party	the Contract
2000 1000 1000 1000 1000 1000 1000 1000	ANITCORNILINE 1000 ANITCORNILINE 1000 ACCHARDITIONE 1000 ACCHARDITIONE 1000 ACCHARDITIONE 1000 ACCHARDITIONE 1000 ACCHARDITIONE 1000 Benzo[a] Fureme 1000 Benzole 1000 Cathazole 1000 Cathazole 1000 Di-n-baryl phthalate 1000 Fexabliorobrane 1000 Fexabliorobrane 1000 Fexabliorophame 1000 Fexabliorophame 1000 Todeno[a] Parklane 100						4-Methytphenol	1000 ug/mL
2000 1000 1000 1000 1000 1000 1000 1000	Avairophenoi						4-Nitrogniline	1000 ng/mr
1000 1000 1000 1000 1000 1000 1000 100	Acenaghttylene						4-Nitrophenol	2000 ng/mL
1000 1000 1000 1000 1000 1000 1000 100	Acengohitylene						Acenarhthene	1000 nevint.
1000 1000 1000 1000 1000 1000 1000 100	Actophanist						Bosnanh+httlene	1000 north
1000 1000 1000 1000 1000 1000 1000 100	Aniling						treatment tene	THE PROPERTY OF THE PARTY OF TH
1900 1900 1900 1900 1900 1900 1900 1900	Aniline						Acetophenone	1000 ug/mL
1000 1000 1000 1000 1000 1000 1000 100	Anthracehe						Aniline	3000 uq/mL
1,000 1,000	Acobergane Acobergane 1000						a dan Caratan	TODO: NOTINE.
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	Benzo (a) anthraceme Benzo (a) filtoranthene Benzo (a) h. 1 perviene Bis (2-chlorocethy) enter Bis (2-chlorocethy) phthalate Carhacole Carhacole Chrysene Dincheyl phthalate Dincheyl phthalate Dincheyl phthalate Dincheyl phthalate Dincheyl phthalate Dinchyl phthalate Bis (2-chlorocethyl) Bis (2-chloroce						Azobenzene	TOYOU DOVET
0	Benzo[a]pyrene Benzo[a, h. i]perylene Benzo[a] alcohol Bis[2-chloroethoxy]methane Bis[2-chloroethox]phrhalate Carbazole Carbazole Chrysne Din-Dutyl phrhalate Di-n-Octyl phrhalate Di-n-Octyl phrhalate Di-n-Octyl phrhalate Di-n-Octyl phrhalate Di-n-Octyl phrhalate Dinerbyl phrhalate Dinerbyl phrhalate Bis[a, h] anthracene Disphrylamine Fluorente Hexachloroenzene						Benzo[a]anthracene	1000 na/mr
	Benzo[s] interaction be Benzo[s] interaction be Benzo[s] in liberylene Benzo[s] in liberylene Benzo[s] interaction be Benzo[s] interaction be Benzo[s] interaction be Benzo[s] interaction be Bis[s-chlorochty] ether Bis[s-chlorochty] ether Bis[s-chlorochty] ether Bis[s-chlorochty] ether Bis[s-chlorochty] ether Bis[s-chlorochty] ether Bis[s-chlorochty] ether Bis[s-chlorochty] ether Bis[s-chlorochty] ether Bis[s-chlorochty] ether Bis[s-chlorochty] ether Bis[s-chlorochty] ether Bis[s-chlorochty] ether Bis[s-chlorochty] ether Bis[s-chlorochty] ether Bis[s-chlorochty] ether Bis[s-chlorochty] ether Bis[s-chlorochty] ether Bis[s-chlorocht] ether Bis[s-chlorochty] ether Bis[s-chl						Month of Particular	Turkey COOL
	Benzol Dillucranthene Benzol Al Lilocranthene Benzol Al alcohol Bis 2-chloroethoxy) methane Bis 2-chloroethoxy) methane Bis 2-chloroethoxy) phthalate Bis 2-chloroethyl) ether Bis 2-chloroethyl) ether Bis 2-chloroethyl) ether Carbazole Carbazole Chryson Dineny al phthalate Dineny a al bhandite Dineny a al bhandite Dineny a al bhandite Dineny a bhandiate Dinenyl phthalate Dinenyl phthalate Dinenyl phthalate Bis 2-chloroethan Eluchyl phthalate Bis 2-chloroethane Hexachloroence Hexachloroethane						panag al hyrana	TOO NOT WE
	Benzo(g,h,l]perylene Benzo(f,tiuoranthene Benzyl alcohol Bis[2-chloroethoxy)methane Bis[2-chloroethoxy)methane Bis[2-chloroethoxy)methane Bis[2-chloroethoxy)methane Bis[2-chloroethy]ether Bis[2-chloroethy]ether Bis[2-chloroeth]ate Carbazole Chrysone Di-n-butyl phthalate Di-n-butyl						Benzo[b]fluoranthene	1000 ng/mt
	Benzol alcohol. Benzol alcohol. Bis 12-chloroethosylmethane Bis 12-chloroethosylmethane Bis 12-chloroethosylmethane Bis 12-chloroethylletter Buttal Banzole Carbazole Carbazole Chrysnel Dineroyl phthalate Dineroyl phthalate Dineroyl phthalate Dineroyl phthalate Dineroyl phthalate Dineroyl phthalate Dineroyl phthalate Dineroyl phthalate Binelbyl phthalate Binelbyl phthalate Binelbyl phthalate Binelbyl phthalate Hexachloroenene						Benkold, h. Ilberylene	1000 Marint.
	Benzyl alcohol Bastz-chlorochtoxylmethane Bistz-chlorochtoxylmethane Bistz-chlorochtoxylmethane Bistz-chlorochtylether Bistz-chlorochtylether Garbasole Chrysole Chrysole Dinnbutyl phthalate Dinnbutyl phthalate Dinnbutyl phthalate Dinnbutyl phthalate Dinnbutyl phthalate Dinethyl phthalate Dinethyl phthalate Dinethyl phthalate Dinethyl phthalate Elucrathanine Flucrathanine Hexachlorochtane						aman fand in its annual	A COUNTY
	Benzyl alcohol. Bis (2-chlotoethoxy) methane Bis (2-chlotoethoxy) methane Bis (2-chlotoethyl) ether Bis (2-chlotoethyl) ether Bustyl benzyl phthalate Carbazole Chrysone Dineryl phthalate Bis (2, h) arthracene Diseryl phthalate Bis (2, h) arthracene Hexachloroenene Hexachloroenene Hexachloroenene Hexachloroenene Hexachloroenene Hexachloroenene Hexachloroenene Hexachloroenene						Benzol & tinoranthene	1000 ug/mL
	Bis(2-chloroethoxy)methane Bis(2-chloroethoxy)methan Bis(2-chloroeth)lether Bis(2-chloroeth)lether Bis(2-chloroeth)lether Cathazole Chloroeth phthalate Di-chotyl phthalate Di-chotyl phthalate Dibens(a,b) anthrache Dibens(a,b) anthrache Dibens(a,b) anthrache Dibens(a,b) anthrache Dibens(a,b) anthrache Eluchalatie Dibens(a,ch) Eluchalatie Eluchalatie Eluchalatie Eluchalatie Hexachloroethane Hexachloroethane Hexachloroethane Hexachloroethane Hexachloroethane Hexachloroethane Indens(l.) 2.3-cd]pyrene						Benzyl alcohol	1000 ug/mt
	Bis(2-chloroethyl)ether Bis(2-chloroethyl)ether Butyl bensyl phthalate Carbazole Chryson Di-n-botyl phthalate Di-n-botyl phthalate Di-n-botyl phthalate Di-n-botyl phthalate Dibens (3, h) authracene Dibens (3, h) authracene Dibensyl phthalate Dibensyl phthalate Dibensyl phthalate Dibensylamine Flucthyl phthalate Flucthylamine Flucthylamine Hexachloroenene enenenenenenenenenenenenenenene						Bis (2-chloroethoxv) methane	1000 ug/mL
0) 12	Big (2-ethylhegyl) phthalate Buyyl bengyl phthalate Carbasole Chrysone Di-n-buyl phthalate Di-n-buyl phthalate Di-n-cyty phthalate Dibenschran Diethyl phthalate Dibenschran Diethyl phthalate Dibenschran Diethyl phthalate Dibenschran Hexachlorobensene Hexachlorobensene Hexachlorobensene Hexachlorobensene Hexachlorobensene Hexachlorobensene Hexachlorobensene Hexachlorobensene Hexachlorobensene Hexachlorobensene Hexachlorobensene Hexachlorobensene Hexachlorobensene Hexachlorobensene Hexachlorobensene						The last of the control of the contr	Table control
u d	Butyl bensyl phthalate Carbasole Chrysaele Chrysaele Chrysael Dienzyl phthalate Dienzyl phthalate Dienzyl phthalate Dienzyl phthalate Dienzyl phthalate Dienzyl phthalate Diethyl phthalate Dimethyl phthalate Elmethyl phthalate Fluctanthene Fluctanthene Fasschlorostere Hexachlorostere						BIONE CHICAGOSCHIATACTICE	min/Sm poot
	Buryl beneyl phthalate Carbacole Chrysene Dinnoyl phthalate Dinnoyl phthalate Dibens(a,b)anthracene Dibens(a,b)anthracene Dipenyl phthalate Dipenyl phthalate Dipenyl phthalate Dipenyl phthalate Dipenyl phthalate Electric phthalate Dipenyl anne Electric phthalate Electric phthala						Bis(2-ethythexy1) putparate	TOOM MAKEU
	Carbasole Chrysene Di-n-Dutyl phthalate Di-n-Octyl phthalate Di-n-Octyl phthalate Dibentyl shinalate Dimethyl phthalate Dimethyl phthalate Dimethyl phthalate Cherylamine Flooranthene Flooranthene Hexachlorobenzene Hexachlorobenzene Hexachlorocyclopentadiene Hexachlorocyclopentadiene Hexachlorocthane Hexachlorocthane Hexachlorocthane Hexachlorocthane Hexachlorocthane Hexachlorocthane Hexachlorocthane						Butyl benzyl phthalate	1000 ng/mF
	Chrysene Din-Dayl phthalate Din-Dayl phthalate Dibens(a,b)anthracene Dibens(a,b)anthracene Distriction Distriction Distriction Distriction Distriction Slocanthese Flucture Flucture Hexachlorobradiane Hexachlorocyclopentadiene						Carbazole	1000 ng/mL
	Di-n-buyl phthalate Di-n-outyl phthalate Dibenz(a,b) anthracene Disethyl phthalate Disethyl phthalate Disethyl phthalate Disethyl phthalate Elocanthene Flocanthene Flocanthene Flocanthene Hexachlorovictophtalate						Chrispine	1000 ng/mI.
	Dienze (a. b) authrache Dibenze (a. b) authrache Dibenze (a. b) authrache Distry! phthalare Distry! phthalare Distry! phthalare Distry! phthalare Distry! phthalare Distry! phthalare Elucinthene Elucinthene Elucinthene Hexachlorobenzene						Bi-n-hatti ahthalato	1000 ma/mt
	Dibens(a,b) purhasare Dibens(a,b) purhasare Diservit phrhalare Diservit phrhalare Diservit phrhalare Diservit phrhalare Elucianthene Fluoranthene Hexachlorobencene Hexachlorobencene Hexachlorobencene Hexachlorosvitalane Hexachlorosvitalane Hexachlorosvitane Hexachlorosvitane Hexachlorosvitane Hexachlorosvitane Hexachlorosvitane Hexachlorosvitane						or navy puchase	THE PROPERTY OF THE PARTY OF TH
	Diservation of the control of the co						DI-H-OGENT burnarara	THIS TO THE
	Diemzefutan Diethyl phthalate Diphethyl phthalate Diphethyl mine Florenter Florenter Hezachiorobenzene Hezachiorobenzene Hezachiorobenzene Hezachiorobenzene Hezachiorobenzene Hezachiorobenzene Hezachiorobenzene Hexachioroethane Hexachioroethane Hexachioroethane Hexachioroethane Indenoll, 2, 3-cdjpyrene						Dibens (a, b) anthracene	3000 ug/mL
	Distbyl phthalare Distbyl phthalare Distbyl phthalare Elecanthene Fluctanthene Fluctanthene Faschlorobusene Hexachlorocyclopentaliene Hexachlorocyclopentaliene Hexachlorocyclopentaliene Hexachlorocyclopentaliene Hexachene						Dibenzofuran	1000 ng/mL
	Dimethyl phthalate Diphenylamine Elocamithene Fluorame Hexachlorobenzene Hexachlorobenzene Hexachlorocylopentadiene Hexachlorocylopentadiene Hexachloroethane Hexachence Hexachence Hexachence Hexachence Hexachence						Diethyl phthalate	Im/pn 0001
	Diphenylamine Flocanthene Flocanthene Flocanthene Hexachlorobensene Hexachlorobylopantadiene Hexachlorosthane Hexachlorosthane Hexachlorosthane Indeno[1, 2, 3-cd]pyrene						Dimethyl phthalare	1000 na/mt.
	Florenthers Florenthers Florenthers Florenthers Hexachlorodusadisms Hexachlorodusadisms Hexachlorodusadisms Hexachlorodusadisms Hexachesens Hexachesens Indeno[1, 2, 3-cd]pyrene						Displant and	1730 may/ml
	# Internet # Flucture # Flucture # Hexachlorobenses Hexachlorocyclopentadiene Hexachlorocthane Hexachlorocthane Indeno[1, 2, 3-cd]pyrene						or mentarement	THILDS OF A
	Flucture Hexachloroburadishe Hexachloroburadishe Hexachlorocthane Hexachlorocthane Hexachlorocthane Indeno[1,0,3-cd]pyrene Isophorone						BINDERDEDE	1000 nd/mr
	Hexachlorobradiane Hexachlorobradiane Hexachlorosthane Hexachlorosthane Hexachlorosthane Todeno[1, 2, 3-cd]pyrene						Fluorene	1000 wg/mr
	Hexachiorogutadiene Hexachiorogutadiene Hexachioroethane Hexachioroethane Hexacheane Indeno[1, 2, 3-cd]pyrene Isophorone						Hexach orobenzene	1000 ug/mL
	Hexachlorocyclopentadiene Hexachlorocthane Hexadecane Indeno[1, 2, 3-cd]pyrene Isophorone						Hezachlorobitadiane	1000 ng/mE
	Hexachloresthane Hexadocane Indeno[1, 2, 3-cd]pyrene Isophorone						Hexach promotonentadiene	1000 no/ml.
	Handling of the Francisco of the Francis						House of Law on the Party of the Control of the Con	Import Cook
	Hekahekane Indeno[1,7,3-cd]pyrene Isophorone						Hexacutotoethane	1000 ng/mr
	Indeno Li, S. 3-cd pyrene Isophorone						Hexadecane	1000 ug/mt
	Isophatone						Indeno[1, 2, 3-od]pyrene	1000 ug/mL
							Isophorone	Jm/bw Goot

REAGENT TRACEABILITY SUMMARY

Job No.: 480-89467-1 Lab Name: TestAmerica Buffalo

Part Part					Washington.	ruadeau Tuares	200		
10 10 10 10 10 10 10 10	Reagent ID	EMD	Prep	Dilutant Used	Final	Reagent ID	Volume	Analyte	Concentration
Septex, Lot A0108968 (Enrohased Reagent)								n-Decame	1000 uq/mL
08/31/16 Resteb, Lot A0108988 (Entchased Reagent) 2 08/31/16 Resteb, Lot A010281 (Entchased Reagent) 2 01/32/18 Resteb, Lot A0310281 (Entchased Reagent) 2 01/32/18 Resteb, Lot A092712 (Entchased Reagent) 3 01/31/16 10/08/15 Methylene Chlotide, Lot Lot A0 ListI NR_20021 50 ul								M-Natrosodi-n-propodamine	1000 sec/mt.
22 08/31/16 Restex, Lot A0108968 (Enrchased Reagent)								N-Netrosedimethylamine	1000 ug/mL
08/31/16 Restex, Lot A0108988 (Furchased Reagent) 2 07/31/16 Restex, Lot A0108989 (Euchased Reagent) 2 07/31/16 10/08/15 Methyleme Calcuide, Lot A082712 (Euchased Reagent) 07/31/16 10/08/15 Methyleme Calcuide, Lot A082712 (Euchased Reagent) 12.1470								N-N Prosodinhenvlamine	2000 ng/mL
08/31/16 Restex, Lot A0108988 (Eurchased Reagent) 2 D7/31/16 Restex, Lot A0110231 (Eurchased Reagent) 2 D7/31/16 10/08/15 Mestrylene Chloride, Lot 10 mL ME_Listi INT 30021 50 mL								n-Octadecane	1000 ug/mL
08/31/16 Restez, Lot A0108968 (Furchased Reagent) 2 07/31/16 Restez, Lot A010231 (Ruthased Reagent) 2 07/31/16 Restex, Lot A0310231 (Ruthased Reagent) 6 01/12/18 Restex, Lot B082712 (Sutchased Reagent) 9 07/31/16 10/08/15 Methylene Chlotide, Lot IO mL MR Listl INT 30021 50 mL								Naphthalene	1000 ng/mt
08/31/16 Restex, Lot A0108968 (Entchased Reagent) 22 D8/31/16 Restex, Lot A010231 (Entchased Reagent) 2 D1/31/16 10/08/15 Mestaylane Chloride, Lot Lom ME Listi INT 30021 50 and								Mirrobanana	1000 wer/mL
07/31/16 Restek, Lot A0108988 (Eurchased Reagent) 2 D1/31/16 Restek, Lot A010231 (Eurchased Reagent) 2 D1/31/16 10/08/15 Mestek, Lot A0310231 (Eurchased Reagent) 3 D1/31/16 10/08/15 Mestek, Lot A092712 (Eurchased Reagent) 4 D1/31/16 10/08/15 Mestek, Lot A092712 (Eurchased Reagent) 5 D1/31/16 10/08/15 Mestek, Lot A092712 (Eurchased Reagent)								Dentachlorophanol	2000 not/ml.
09/31/16 Restex, Lot A0108908 (Eurchased Reagent) 2 D7/31/16 Restex, Lot A0110231 (Eurchased Reagent) 2 D7/31/16 Restex, Lot A0110231 (Eurchased Reagent) 2 D7/31/16 10/08/15 Methylene Chloride, Lot IO mL RE_ListI_INT_00021 50 mL								Phenanthrene	1000 novmE
08/31/16 Restek, Lot A0108988 (Furchased Reagent) 2 07/31/16 Restek, Lot A0310231 (Furchased Reagent) 2 07/31/16 Restek, Lot A0310231 (Furchased Reagent) 2 07/31/16 10/08/15 Methylene Calcuide, Lot R092712 (Furchased Reagent) 121470 50 01/31/16 10/08/15 Methylene Calcuide, Lot R0 mL ME Listi INT 30021 50 01								Phenol	1000 ug/mL
02 08/31/16 Restex, Lot A0108988 (Furchased Reagent) 2 07/31/16 Restex, Lot A010231 (Eurchased Reagent) 2 07/31/16 Restex, Lot A0310231 (Eurchased Reagent) 2 01/32/18 Restex, Lot A092712 (Eurchased Reagent) 3 07/31/16 10/08/15 Methylene Caloride, Lot 10 mL ME ListI INT 30021 S0 nL								DOLLARDE	1889 ng/ml.
08/31/16 Restek, Lot A0108988 (Furchased Reagent) 2 07/31/16 Restek, Lot A010231 (Entchased Reagent) 2 07/31/16 10/08/15 Restek, Lot A03712 (Entchased Reagent) 3 07/31/16 10/08/15 Methylene Chlotide, Lot A092712 (Sutchased Reagent) 121470 Sutchased Reagent)								200 July 190	1000 44/mf.
22 08/31/16 Restek, Lot A0110231 (Eurchased Reagent) 2 01/31/16 10/08/15 Methylene Chloride, Lot 10 mL/NE ListI INT 30021 50 mL	WR. 1193 W. OTN. DOGO	217,727,716		2000 TOT TOT DOUGH		ges besedening/	ranti	Table of the Control	Tm/200 0000
2 07/31/16 Restex, Lot A0102939 (Eurchased Reagent) 2 07/31/18 Restex, Lot A0310231 (Furchased Reagent) 2 07/31/16 10/08/15 Methylene Chloride, Lot 10 mL MR Listling 30021 SD mL 121470	TOO WE DESCRIPTION OF THE PARTY	27/17/102		postoret and transport			1	Indepe	2000 novel.
2 01/12/18 Restek, Lot A0110231 (Eurchased Reagent) 2 01/12/18 Restek, Lot R092712 (Eurchased Reagent) 01/31/16 10/08/15 Methylene Chloride, Lot 10 mL RE Listl INT 20021 S0 mL	MR 11911 SWE DOORS	A1477/16		Serrer Tor BOTOROSO		(Purchased Rea	rent!	4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	9000 vovm1.
2 01/31/16	20000			1			-	Henry Jehicke	2000 un/ml.
2 01/12/18 Restek, Lot A092712 (Eurchased Reagent) 07/31/16 10/08/15 Methylene Chloride, Lot 10 mL ME List1 LWT 08021 50 mL								Captolactam	2000 ug/mL
2 01/12/18 Restek, Lot A092712 (Eurchased Reagent) 07/31/16 10/08/15 Methylene Caloride, Lot 10 mL ME List1 LWT 38021 58 mL	MB 1139 STE 00002	07/31/16				(Purchased Read	rent)	3.3'-Dichlorobenzidine	2000 ug/mt
07/31/16 10/08/15 Methylene Chloride, Lor 10 mil MR_ListI_INT_30021 55 mil 121470								Benzidine	2000 ud/mL
07/31/16 10/08/15 Methylene Chloride, Lor 10 mL Me Listi LWT 00021 50 mL	MB SURR STR 00042	01/12/18		Restek, Lot A092712		(Purchased Rea	rent)	2,4,6-Tribromophenol	5000 ug/mL
07/31/16 10/08/15 Methylene Chloride, Los 10 mL ME Listi LWT 08021 55 mL								2-Fluorobibhenyl	5000 ng/mL
07/31/16 10/08/15 Methylene Chloride, Lor 10 mL MB_ListI_INT_38021 55 mL								2-Fluorophenol	5000 uq/mL
07/31/16 10/08/15 Methylene Calozide, Lor 10 mL/NR ListI LWT 38021 58 mL									5000 ng/mt
07/31/16 10/08/15 Methylene Caloride, Lor 10 mL M8 ListI LW 08021 55 nL									Jm/pw 0008
07/31/16 10/08/15 Methylene Chloride, Lor 10 mL MR_List1_INT_30021 59 mL									5000 ug/mL
121470	MB LILVI WRK 00116	01/31/16		Methylene Chloride, Lor		Listl INT 08021	50 ni	I,I'-Biphenyl	1 ng/mr
1.2.4.9.7 Trach coronaens 1.2.10th orobenses 1.2.10th orobenses 1.3.10th orobenses 1.3.10th orobenses 1.3.10th orobenses 1.4.10th orobenses 1.4.10th orobenses 1.4.10th orobenses 1.4.10th orophenol 2.4.0th orophenol 2.4.5.Trach orophenol 2.4.10th orophenol 2.4.10th orophenol 2.4.10th orophenol 2.4.10th orophenol 2.4.10th orophenol 2.4.10th orophenol 2.5.10th orophenol 2.5.10th orophenol 2.5.10th orophenol 2.5.10th orophenol 2.5.10th orophenol 2.5.50th orophenol 2.5.50th orophenol 2.5.50th orophenol 2.5.50th orophenol 2.5.50th orophenol 2.50th orophenol 2.50th orophenol				121470				i i	
1.2-14-17 tan to robe become 1.2-14-12 tan to robe become 1.3-20 tan to robe become 1.3-20 tan to robe become 1.3-20 tan to robe become 1.3-20 tan to robe become 1.3-20 tan to robe become 1.3-20 tan to robe become 1.4-20 tan to robe become 1.3-40 tan t								1,2,4,5-Tetrachlorobensens	I ng/mr
1.4 - Ditchilorobensene 1.5 - Ditchilorobensene 1.5 - Ditchilorobensene 1.5 - Ditchilorobensene 1.4 - Ditchilorobensene 1.4 - Ditchilorobensene 1.4 - Ditchiloropensene 1.5 - Ditchiloropensene 1.5 - Ditchilorophenol 2.5 - Ditchilorophenol								I, 2, 4-Trichlorobenzene	Tud/unT
1. 2-Diphenylhydiatazine 1. 3-Dinitolorobensene 1. 4-Dinatrobensene 1. 4-Dinatrobensene 1. 4-Dinatrobensene 1. 4-Dinatrobensene 1. 4-Dinatrobensene 2. 3 '-oxybis[1-chloropropane] 2. 3 ', 4'-Fitachorophenol 2. 4'-Fitachorophenol 2. 4-Dinitrophenol 2. 4-Dinitrophenol 2. 4-Dinitrophenol 2. 4-Dinitrophenol 2. 4-Dinitrophenol 2. 5-Dinitrophenol 3. 5-Dinitrophenol								1,2-Dichlorobensene	I nd/mr
1.3-inchingtopensens 1.4-initiophensens 1.4-initiophensens 1.4-initiophensens 1.4-initiophensens 1.4-initiophensens 1.4-initiophensensensensensensensensensensensensense								1, 2-Diphenylhydrazine	1 nd/mF
1.3-Dinat tobefizene 1.4-Dickhorobensene 1.4-Dickhorobensene 1.4-Dickhorophenel 2.5.4-Dickhorophenel 2.5.4-Dickhorophenel 2.4-Dickhorophenel 2.4-Dickhorophenel 2.4-Dickhorophenel 2.4-Dickhorophenel 2.4-Dickhorophenel 2.4-Dinitrophenel 2.4-Dinitrophenel 2.4-Dinitrophenel 2.5-Dickhorophenel 3.5-Dinitrophenel								1,3-Dichlorobensene	Tw/gn I
1.4-bicaboroenea 1.4-bi								1,3-Dimitrobenzene	Ing/mr
1.4-Dioxante 1.4-Dioxante 2.5. "coxybiliaphthalene 2.5. 4.5-Tettachlorophenol 2.5. 4.5-Tettachlorophenol 2.4.5-Tettachlorophenol 2.4-Dichlorophenol 2.4-Dichlorophenol 2.4-Dichlorophenol 2.4-Dichlorophenol 2.4-Dinitrophenol 2.4-Dinitrophenol 2.5-Dinitroplenol								1,4-Dichlorobenzene	Tud/mT
1. Areitylaphthalene 2.3coxybis1-chiotopane] 2.4.4.6-Tetashiotophenol 2.4.5-Tetashiotophenol 2.4.0-Tetashiotophenol 2.4-Dichiotophenol 2.4-Dinitrophenol 2.4-Dinitrophenol 2.4-Dinitrophenol 2.4-Dinitrophenol 2.5-Dinitrophenol								I,4-Dioxane	l ug/mt.
2.3. ".ewybis1-chloropropane] 2.4.5. Truchloropropane] 2.4.6. Truchloropheno] 2.4.5. Truchloropheno] 2.4.5. Truchloropheno] 2.4.5. Truchloropheno] 2.4.5. Truchloropheno] 2.5.5. Truchloropheno] 2.5.5. Truchloropheno] 2.5. Truchloropheno] 3.5. Truchloropheno]								1-MethyInaphthalene	1 ng/mF
2.3.4,6-Tettachlotophenol 2.4,5-Tettachlotophenol 2.4-10-Tettachlotophenol 2.4-10-Tettachlotophenol 2.4-10-Tettylphenol 2.4-Tettylphenol 2.4-Tettylphenol 3.4-Tettylphenol 3.4-Tettachlotophenol 3.4-Tettachlotophenol 3.5-Tettachlotophenol 3.5-Tettachlotophenol 3.5-Tettachlotophenol 3.5-Tettachlotophenol 3.5-Tettachlotophenol 3.5-Tettachlotophenol 3.5-Tettachlotophenol								2.2 - caybis[1-chloropropane]	I ng/mL
2.4.5-Tetachlorophenol 2.4-Tetachlorophenol 2.4-Ditchlorophenol 2.4-Ditchlorophenol 2.4-Ditchlorophenol 2.4-Ditchlorophenol 2.4-Ditchlorophenol 2.5-Ditchlorophenol 2.5-Ditchlorophenol 2.5-Ditchlorophenol 2.5-Ditchlorophenol 2.5-Ditchlorophenol 2.5-Ditchlorophenol 2.5-Ditchlorophenol 2.5-Ditchlorophenol								2, 3, 4, 6-Tetrachlorophenol	1 ag/mL
2.4,6-Trothorophenol 2.4-Diminophenol 2.4-Diminophenol 2.4-Diminophenol 2.4-Diminophenol 2.5-Diminophenol 2.5-Diminophenol 2.5-Diminophenol 2.5-Diminophenol 2.5-Diminophenol 2.5-Diminophenol								2,4,5-Trichlorophenol	I ug/mI
2.4-Thichlorophenol 2.4-Thichlorophenol 2.4-Thintrophenol 2.4-Thintrophenol 2.4-Thintrophenol 2.4-Thintrophenol 2.5-Thintrophenol 2.5-Thintrophenol 2.5-Thintrophenol 2.5-Thintrophenol 2.5-Thintrophenol								2,4,6-Trichlorophenol	I ng/mT
2.4-Dimethylphenol 2.4-Dimitrophenol 2.4-Dimitrophenol 2.5-Dimitrophenol 2.5-Dimitrophenol 2.5-Dimitrophenol 2.5-Dimitrophenol 2.5-Dimitrophenol 2.5-Dimitrophenol 2.5-Dimitrophenol								2,4-Dichlorophenol	Tud/mT
2.4-Tinitrophenol 2.4-Tinitrophenol 2.5-Tinitrophenol 3.5-Tinitrophenol 3.5-Tinitrophenol 2.5-Chlorophenol								2,4-Dimethylphenol	1 ng/mF
2.4-inalizophene 2.5-inalizophenel 2.5-inalizophenel 2.5-inalizophenel 2-chlorophenel								2,4-Dinitrophenol	2 ug/mL
2.5-Inchorophenol 2.5-Inchorophenol 2.5-Inchorophenol 2.5-Chloromaphthalene								2,4-Dinitrotoluene	I ng/mr
2,6-Dinitrotoluene 2-cho computatene								2,6-Dichlorophenol	1 ng/mr
2-chloromaphthalede 2-chlorophenol								2,6-Dinitrotoluene	Twd/mr
2-Chlorophenol								2-Chloronaphthalene	1 ng/mr
								2-Chlorophenol	1 ng/mF
000000000000000000000000000000000000000					The state of the state of	000			A S. State Company of the

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

			Reagent	Facent Neadent			
H 1-1	Prep Date	Dilutant	Final	Reagent ID	Volume Added	Analyte	Concentration
						2-MethyInaphthalene	I workmi
						2-Methylphenol	T ng/mp
						2-Without line	i na/ml.
						2-N: troubehol	1 novm
						3-Nitroaniline	1 ug/mL
						4,6-Dinitro-2-methylphenol	2 ng/mt
						4-Bromophenyl phenyl ether	Tut/pw.T
						4-Chloro-3-methylphenol	1 ug/mL
						4-Chloroaniline	1 ng/mE
						4-Chlorophenyl phenyl ether	1 ng/mr
						4-Methylphenol	1 ng/ml
						4-Nithogniline	T we/mt
						4-Nithophenol	2 ug/mL
						Acenaphthene	I ng/mL
						Acenaphthylene	I ng/mI.
						Bootonborono	Tucker L
						Account and	Tank and
						Date water	July John 4
						Anchogogne	Total and T
						Agonemagne	Tu /Sn T
						Benzolalantniacene	Tui/bn -
						Benzo[a]pyrene	1 ng/mr
						Benzo[b]fluoranthene	I ng/mF
						Benzo[g,h,1]perylene	Ind/mt
						Benzo[k]fluoranthene	I wer/roll
						Benzyl alcohol	1 ud/mL
						Bis (2-chloroethony) methane	1 ng/mr
						Bis(2-chloroethyllether	1 ng/mL
						Bis (2-sthulhexvi) ohthalate	1 nor/ml.
						Buryl bensyl phrhalate	1 Mg/mL
						0.0000000000000000000000000000000000000	Two year
						Christian	1 wee/ml.
						Di-n-bury phthalate	T nc/ml.
						Di-n-octv phthalate	1 ng/ml.
						Dibenz(a, h) anthracene	1 ug/mL
						Dibenzofuran	T ug/mf
						Diethyl phthalate	1 ug/mL
						Dimethyl phthalate	Tud/bn I
						Diphenylamine	1.71 nd/mL
						Fluoranthene	1 ug/mL
						Sluccene	I ng/mL
						Hexachlorobenzene	1 ng/mg
						Mexachlorobutadiene	1 uct/mL
						Heyachi orocvel opentadiane	1 wayant.
						House hand	1 norther
						Hexadagara	1 no/ml.
						Indensill. 2. 3-rellaymene	1 ng/mt
						Isophorone	I ug/mL
						n-Decane	I ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

					Tagadant	Patent Reagent	int.		
Reagent ID	EMP	Prep	Dilutant		Final	Reagent ID	Volume	Analyte	Concentration
								adime Lydoru-u-tosod trans	Twa/mt
								N-Nitrosodimethylamine	Tud/mT
								N-Nitrosodiphenylamine	2 nd/mT
								n-Octadecane	1 novm
								Naphthalene	1 ng/mg
								Mitrobenzene	1 ng/m
								Pentachlorophenol	2 wer/mL
								Phenanthrene	1 ad/mL
								Phenol	1 novmi
								Pyrene	1 ng/mL
								Pyridine	I no/ml.
								Benzele agid	1 wer/mt.
								Indehe	T nd/mr
								Attezine	I ng/mL
								Benzaldehvde	1 ncr/mI.
								Cantolactam	Tuc/mI.
								2. O'-Dich proberoiding	T ner/ml.
								Donot Alino	The state of the s
								2.4.6-Tribromonhenol	1 ner/ml.
								Or Management agent	Import 1
								A STANDARD BONDA	1 1/2/20T
									T ng/mr
									T nd/mr
								p-Terphenyl-dl4 (Surr)	E ng/mr
								_	
MB List INT 00021	01/31/16	09/51/18	Methylene Chloride, Lor	ride, hor	10 01	MB L181 STK 00023	In COOZ	1,1'-Biphenyl	200 ng/mL
			110000					1.2.4.5-Tetrachiorobenzene	200 ner/ml.
								a o a mercan analysis and	107 co 000
								2 0 5 4 1 1 2 CALCOCOMME	Total 100 5
								1 o Dimboned had named	July20 000
								1, 2 Dipheny iny district	THI / 5th 1000
								T/3-DICHTOLOGORNSCHE	200 ag/mr
								1,3-Ulmitionensene	ZOU NG/ML
								1,4-Dicalorobenzene	ZOO NG/ML
								I, 4-Dloxane	Tm/5n no2
								I-Methylnaphthalene	200 ng/mL
								2,2'-oxybis[1-chloropropane]	200 ug/mL
								2,3,4,6-Tettachlorophenol	200 ug/mL
								2,4,5-Trichlorophenol	200 ug/mL
								2,4,6-Trichiorophenol	200 ng/mL
								2,4-Dichlosophenol	200 ug/mL
								2,4-Dimethylphenol	200 ug/mL
								2,4-Dimitrophenol	400 ng/mL
								2,4-Dinitrotoluene	200 ug/mL
								2,6-Dichlorophenol	200 ng/mL
								2,6-Dimitrotoluene	200 ug/mL
								2-Chloronaphthalene	200 ug/mL
								2-Chlorophenol	200 uc/mL
								2-Methylnaphthalene	200 ug/mL
					200	2003-			1100000
					Page 100 of 320	Of 320			1712/2011

Jap No.: 480-89467-1

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				Tuescas	A 1 C 1 C 1 C 1 C 1 C 1 C 1 C 1 C 1 C 1			
Reament ID	EMp	Prep	Dilutant	Final	Reagent ID	Volume	Analyte	Concentration
							2-Methylphenel	200 ng/mt
							2-Wetrospeline	200 set/mL
							3-Mcfrombanel	700 wa/m1
							3-M troops 1 tha	200 ww/mt
							4 Kallenstrongumerbulahanat	And war and
							A-Grandelence wheny prenot	350 wor/mi
							4-Chloro-3-methylphenol	200 Act/mL
							4-Chloroaniline	200 ng/mL
							4-Chlorophany nbeny sther	200 waymf.
							d-Mathidahanal	200 kg/mt.
							A Metronellen	Taylor of the
							4-Nilboaniii	100 mg/m
							4-Nitrophenol	400 ug/mt
							Acenaphthene	ZOO ug/mt
							Acenaphthylene	200 ng/mL
							Acetophenone	200 ng/mL
							Aniline	200 ug/mL
							Anthracene	200 ug/mL
							Azobenzene	200 ug/mL
							Benzo[a]anthracene	200 ud/mL
							Benzofalpvrene	200 uq/mL
							Benzolbifluoranthene	
							Benzolg.h.ilbervlene	200 ug/mL
							Bengolklfluoranthene	250 na/m
							Benzyl alcohol	200 Mg/mL
								200 ng/ml.
							Bis 10 - chlorochorl othor	10/00 000
							pis(s-curocoecula) echer	
							bisiz-ethyinexy, promarace	THI/BR 007
							bucyl benzyl phenalare	TIII / DII 7007
							Chromsole	TW/50 002
							Chrysene	ZOU UG/ML
							D1-n-butyl phthalate	TIM /BN 007
							Di-n-nctyl phthalate	200 ug/mL
							Dibenz(a, b) anthracene	200 ng/mL
							Dipensolutan	7m/bn 007
							Diethyl phthalate	Jm/6n 002
							Nimethyl phthalate	TW/Bn noz
							Dipnenylamine	342 ug/mL
							Placemen	This has
							Uses oft anohamens	Shirt worker
							Mocuola betolarand tong	700 werker
							Character or other bases and the control of the con	July 2002
							Herach lorder hane	500 kg/mt.
							Hexadenana	200 no/mL
							Indenoil, 2, 3-odibyrene	250 ug/mL
							Isophorone	200 wa/mL
							n-Decane	200 ug/mL
							N-Nitrosodi-n-propylamine	200 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Job No.: 480-89467-1

Page Page	Early Earl	Early Earl					ACCOUNT OF	Parent Reagent	241		
WALL CrossCulpushery) infinite WALL CrossCulpushery) infinite WALL CrossCulpushery) infinite WALL CrossCulpushery) infinite WALL CrossCulpushery) infinite WALL CrossCulpushery) infinite WALL CrossCulpushery) infinite WALL CrossCulpushery) infinite WALL CrossCulpushery) infinite WALL CrossCulpushery) infinite WALL CrossCulpushery) infinite WALL CrossCulpushery) W	WANTE CONSOLIDER PLANTAINE WANTE CONSOLIRED PLANTAINE PLANTAINE WANTE CONSOLIRED PLANTAINE	National Content of the Content of	Reajent ID	EMp	Prep	Dilutant	Final	Reagent ID	Volume Added	Analyte	Concentration
The contraction of the contrac	NOTE SECRETARY NOTE	Note Note								At the bound of the sale of th	The State of State of
Notice to the continue of th	Notice to the continue of th	Notice to the problem Notice to the problem								N-NICEOSOGIMETHYLAMERE	mm/bm nov
12/31/15 Restex, Lot 6011991 Walliage Restriction Reserving Reserving Restriction Reserving Re	National Control Con	12/31/16 Registry Acceptance Registry Registr								N-Nitrosodiphenylamine	400 ng/mp
National National	12/31/16 Refer, Lot 4011994 Was 1,810.87% 90002 1900 up Pricent	12/31/15 Restre.k, 1ot 00111934 Restr.k, 1ot 0011934 Restr.k, 1								n-Octadecane	200 ug/mL
12/31/16 Regret, Lot 40211934 Valunhased Response 1.2 - 2.5 incorphered 2.	12/31/15 Respect, Lot 80111284 Respect to 1000 t	Page Page								Naphthalene	200 ng/mL
The coll corphanol Phenol	12/31/16 Restep, Lot 80111934 Wallstoom Restaurable Restaurabl	13/31/15 Regret, Lot 6011/93 We will have a least of the content of the co								Mitthensane	200 un/ml.
12/31/16 Regist, Lot A0111934 (Eurihaased Reagent)	12/31/15 Restex, lot 6011123 Restex, l	Principal								Tantach Croshano	4A0 na/mf.
12/31/16 Restek, Lot AD11123 (Suthhäsed Respent) 12/31/16 Restek, Lot AD11123 (Suthhäsed Respent) 12/31/16 Restek, Lot AD11123 (Suthhäsed Respent) 12/31/16 Restek, Lot AD11123 (Suthhäsed Respent) 12/31/16 Restek, Lot AD11123 (Suthhäsed Respent) 12/31/16 Restek, Lot AD11123 (Suthhäsed Respent) 12/31/16 Restek, Lot AD11123 Restek, Lot AD1123 Restek, Lo	12/31/16 Resteb. Lot 40011/19/3 1000 14 21.011/10/2 1000 14 21.011/2 21.011/	12/31/16 Restek, Lot 400111934 (Surphased Respent)								roman de company	THE COLUMN
Parameter Para	Parent P	Pursule Purs								Phenanthrene	7m/5w 667
12/31/15 Regret, Lot 4021123 (Sutchhaed Reagent) 1.5.10.00000000000000000000000000000000	Parather	18/31/16 Registry 1000 to 1 Registry 188 11811 287 20002 1000 to 1 Registry 12/31/16 R								Phenol	200 ug/mL
12/31/16 Regire X, Lot A0211998 Fauth Regire X Regire	12/31/15 Regret, Lot ROITIFS WE LIST STW, 70002 1000 at Paradite acid	12/37/15 Regret, Lot Autilies								Pyrene	200 ng/mt.
12/31/16 Restex, Lot A0211934 Vigurhased Reagent) 12/31/16 Restex, Lot A0211934 Vigurhased Reagent) 12/31/16 Restex, Lot A0211934 Vigurhased Reagent) 12/31/16 Restex, Lot A0211934 Vigurhased Reagent) 12/31/16 Restex, Lot A0211934 Vigurhased Reagent) 12/31/16 Restex, Lot A0211934 Vigurhased Reagent) 12/31/16 Restex Letter Let	12/31/16 Restex, Lot 60211934 (Entohased Reagent) 1.2 (4.5-T.c.) tecophenol	12/31/16 Restee, Lot A011193 Rangent								Pyridine	200 ug/mL
12/31/16 Restex, lot Aulilians Restex, lot Aulil	12/31/16 Restex, Lot 60211934 (Sughased Respent) 12/31/16 Restex, Lot 60211934 (Sughased Respent) 12/31/16 Restex, Lot 60211934 (Sughased Respent) 12/31/16 Restex, Lot 60211934 (Sughased Respent) 12/31/16 Restex, Lot 60212042 (Sughased Respent) 12/31/16 Restex, Lot 60212042 (Sughased Respent) 12/31/16 Restex, Lot 60212042 Respent) 12/31/16 Restex, Lot 60212042 Respent) 12/31/16 Restex, Lot 60212042 Respent) 12/31/16 Restex, Lot 60212042 Respent) 12/31/16 Restex, Lot 60212042 Respent) 12/31/16 Restex, Lot 60212042 Respent) 12/31/16 Restex, Lot 60212042 Respent) 12/31/16 Restex, Lot 60212042 Respent) 12/31/16 Restex, Lot 60212042 Respent) 12/31/16 Restex, Lot 60212042 Respent) 12/31/16 Restex, Lot 60212042 Respent) 12/31/16 Restex, Lot 60212042 Respent) 12/31/16 Restex, Lot 60212042 Respent) 12/31/16 Restex, Lot 60212042 Respent) 12/31/16 Restex, Lot 60212042 Respent) 12/31/16 Restex, Lot 60212042 Respent) 12/31/16 Restex, Lot 60212042 Restex, Lot 60212	12/31/15 Rectet, Lot RO11131 Rectet, Lot RO1131 Rectet, Rec						MB LISIG STR 00002	1500 nl		250 ug/mL
12/31/15 Resteb, Lot A021193 (Sutphased Reagent) 1.3 - 2.7 (Accordance) 1.2 - 4.5 - 7.4 (Accordance) 1.2 - 4.5	12/31/16 Restex, lot Aulilians Restex, lot Aulil	12/31/16 Regrek, Lot A0211934 (Suthhased Reagent)									200 ud/mL
12/31/16 Restex, Lot ADIII/934 (Surphased Respent)	12/31/16	12/31/16					150	MR TASTA STE DOOD	3000 mL	-	SOO nother
NE 1.159 STX 00002 1000 0L 2.3 -0.10.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.	12/31/16 Restex, Lot 401412 2.5 - 1000 at 2.5 - 1000 at 1.5 - 1000	NE_LISS_STK_00002 1000 uL_0.5-T-DictiorCoencidine						The state of the s		-	100 months
12/31/15 Restex, Lot Foliased Respent)	13/31/16 Restex, Lot holitos Str. 20002 1000 to Str. 20004 10.2 + Classical date 13/31/16 Restex, Lot holitos Str. 20004 10.2 + Classical date 13/31/16 Restex, Lot holitos Str. 20004 10.2 + Classical date 13/31/16 Restex, Lot holitos Str. 20004 10.2 + Classical date 13/31/16 Restex, Lot holitos Str. 20004 10.2 + Classical date 13/31/16	12/31/16 Restex. Lot 60211934 (Sutohused Reagent)								and managed and and and and and and and and and an	military cons
12/31/16 Regiet, Lot Auffled Regiet Regiet Regiet Recompleted	12/31/16 Restex, Lot Anille Restex, Lot Anille Restex, Lot Anille Restex, Lot Anille Restex Restriction Restrict	13/31/16 Restex, lot ADITION Restex Restex, lot ADITION Restex					1			-	200 ng/mr
12/31/16 Restex, Lot 60111934 (Sutsinged Reagent)	12/31/16 Restex, Lot Autiliary Restex, Lot Autil	12/31/16 Restex, Lot Autile3 (Suth dissed Respent)						ME LISS STK DOODS	1000 mr	-	200 ng/mr
NB_SURR_SUR_D0042	12/31/16 Restex, Lot 6011998 (Sutchmered and Reagent)	12/31/16 Rester, Lot Audil984 (Surphased Respent) 2.5 luorobindendum 2.5 luorobinde								_	200 ug/mL
2-8 lucychpheny 2-8 lucychpheny 12 lucychpheny 12 lucychpheny 13 lucychpheny 14 lucychpheny 15 lucychpheny 16 lucychpheny 17 lucychpheny 17 lucychpheny 18 lucychpheny 18 lucychpheny 19 lucychpheny 19 lucychpheny 10 lucychpheny 10 lucychpheny 10 lucychpheny 11 lucychpheny 12 lucychpheny 13 lucychpheny 14 lucychpheny 15 lucychpheny 16 lucychpheny 17 lucychpheny 18 lucychpheny 18 lucychpheny 19 lucychpheny 19 lucychpheny 19 lucychpheny 10 lucychpheny 10 lucychpheny 10 lucychpheny 11 lucychpheny 12 lucychpheny 13 lucychpheny 14 lucychpheny 15 lucychpheny 16 lucychpheny 17 lucychpheny 18 lucychpheny 18 lucychpheny 18 lucychpheny 19 lucychpheny 19 lucychpheny 19 lucychpheny 10 lucychpheny 10 lucychpheny 10 lucychpheny 11 lucychpheny 12 lucychpheny 13 lucychpheny 14 lucychpheny 15 lucychpheny 16 lucychpheny 17 lucychpheny 18 lucychpheny 18 lucychpheny 18 lucychpheny 19 lucychpheny 19 lucychpheny 10 lucychpheny 10 lucychpheny 10 lucychpheny 10 lucychpheny 10 lucychpheny 10 lucychpheny 10 lucychpheny 10 lucychpheny 10 lucychpheny 10 lucychpheny 10 lucychpheny 10 lucychpheny 10 lucychpheny 10 lucychpheny 10 lucychpheny 10 lucychpheny 10 lucychpheny 10 lucychpheny 11 lucychpheny 12 lucychpheny 13 lucychpheny 14 lucychpheny 15 lucychpheny 15 lucychpheny 16 lucychpheny 17 lucychpheny 18 lucychpheny 18 lucychpheny 19 lucychpheny 10 lucychpheny 10 lucychpheny 10 lucychpheny 11 lucychpheny 12 lucychpheny 13 lucychpheny 14 lucychpheny 15 lucychpheny 15 lucychpheny 16 lucychpheny 17 lucychpheny 18 lucychpheny 18 lucychpheny 18 lucychpheny 18 lucychpheny 19 lucychpheny 10 lucychpheny 10 lucychpheny 10 lucychpheny 10 lucychpheny 10 lucychpheny 10 lucychpheny 10 lucychpheny 10 lucychpheny 10 lucyc	2-310-cobjanesty	2-110c00pheny1					-7	MB SURR STK 00042	400 ul	_	200 uq/mL
12/31/16 Restex, Lot BOILING Restex, L		Niccologonosis-de Garri Niccologonosis-d						1		_	200 ud/mL
12/31/16 Restex, Lot Autily30 Restex Restex, Lot Autily30 Restex Restex, Lot Autily30 Restex Reste	12/31/16 Restek, Lot Anilised Restek Lot Anilised Restek Lot Anilised Restek Lot Anilised Restek Lot Anilised Restek Lot Anilised Restek Lot Anilised Restek Lot Anilised Restek Restek Lot Anilised Restek Re	12/31/16 Restex, Lot Anil1994 (Butchased Reagent) L.2, 4, 9-tylenyl-did (Sutr)								Origina respication	300 notml.
12/31/16 Restex, Lot Anilion Restex, Lot Anilion Restex, Lot Anilion Restex Reste	Restex, Lot Roiliged (Surbhased Reagent) 1.2 - 4.5 - 4	Restex, Lot Autilian Restex, Lot Autilian									Time Or 2
Parcol-ds Parcol-ds Parcol-ds Parcol-ds Parcol-ds 1.7.4 Tolicobence 1.2.4 Tolicobence 1.2.4 Tolicobence 1.2.4 Tolicobence 1.2.4 Tolicobence 1.3.4	Parent and the second and second anative and second and second and second and second and second and	Parent - 45								Microbensene-d5 (Surr)	200 ng/mL
Pestex, Lot A0211934 (Eutphused Reagent) 12,45-Teinchorobensen 11,2,45-Teinchorobensen 11,2,45-Teinchorobensen 11,2,45-Teinchorobensen 11,2,45-Teinchorobensen 11,3-Dinnitrobensen 11,3-Di	12/31/16 Restex, Lot Anill934 (Sutphused Reagent) 12.48thewl 1.2.45thewl 1	12/31/16 Restex, Lot Ruilined Respect 1.1 - Ripheryl 1.2 - Ripheryl 1.2 - Ripheryl 1.2 - Ripheryl 1.2 - Ripheryl 1.2 - Ripheryl 1.3 - Ripheryl 1.3 - Ripheryl 1.4 - Ripheryl 1.3 - Ripheryl 1.4 - Riphe								p-Terphenyl-dl4 (Surr)	200 ug/mL
12/31/16 Restex, Lot April 934 (Eurphased Reagent) 1/12-46-Trian Colectobersene 1/2-4-Trian Colectobersene 1/2-4-Trian Colectobersene 1/3-Trian Coletobersene 1/3-Trian	12/31/16 Restex, Lot Anill934 (Sutchased Reagent) 1.7Eighbenyl 1.2.4.Tarichlorobenzene 1.2Dichlorobenzene 1.2Dichlorobenzene 1.3Dichlorobenzene 1.3Dichloropenzene 1.3.	12/31/15 Restex, Lot Anillo34 (Sutphased Reagent) 1.7.4 Text Chlochemene 1.2.1.2. Dictal cochemene 1.2.1.2. Dictal cochemene 1.2.1.2. Dictal cochemene 1.3.1.2. Dictal cochemene 1.3.1.3. Dictal cochemene 1.3.							Phenol-d5	200 ng/mt	
1.2.4 9-Terrachlorobensene 1.2-Dichlorobensene 1.2-Dichlorobensene 1.3-Dichlorobensene 1.3-Dichlorobensene 1.3-Dichlorobensene 1.3-Dichlorobensene 1.4-Dichlorobensene 1.4-Dichlorobensene 1.4-Dichlorobensene 1.4-Dichloropensene	1,2,4,5-Tetrachlorobensen 1,2-Dichlorobensen 1,2-Dichlorobensen 1,3-Dichlorobensen 1,3-Dichlorobensen 1,3-Dichlorobensen 1,4-Dichlorobensen 1,4-Dichlorobensen 1,4-Dichloropensen 1,4-Dichloropensen 1,4-Dichloropensen 1,4-Dichlorophenol 2,4-Dichlorophenol 2,4-Di	1,2,4,5-Tetrachlorobensen 1,2-Dichlorobensen 1,2-Dichlorobensen 1,3-Dichlorobensen 1,3-Dichlorobensen 1,3-Dichlorobensen 1,4-Dichlorobensen 1,4-Dichlorobensen 1,4-Dichlorobensen 1,4-Dichlorobensen 1,4-Dichlorobensen 1,4-Dichlorobensen 1,4-Dichloropensen 1,4-Dichlorophenol 2,3-4-Dincthlorophenol 2,4-Dincthlorophenol 2,4-Dincthlorophenol 2,4-Dinttrocoluere 2-Chlorophenol 2-Methylphenol 2-Methylphenol 2-Methylphenol 2-Methylphenol 2-Methylphenol	MR 1357 STK DODGS	13/32/16		Regres, Lot Attitues		(Butchassed Reac	renti	1.1Rinharvi	1000 Mer/mL
rogane]	1.2-9-chlorobenzene 1.2-9-chlorobenzene 1.2-0-chlorobenzene 1.3-0-chlorobenzene 1.3-0-chlorobenzene 1.3-0-chlorobenzene 1.4-0-chlorobenzene 1.4-0-chlorobenzene 1.4-0-chloropene 2.5-1-chloropene 2.5-1-chloropene 2.4-5-Trichloropene 2.4-5-Trichloropene 2.4-0-chloropene 2.4-0-chloropene 2.4-0-chloropene 2.4-0-chloropene 2.5-0-chloropene 2.6-0-chloropene 2.6-0-chlo	1.2.7.4.Trichlorobenzene 1.2.1.c.1.c.1.c.nobenzene 1.3.1.c.1.c.nobenzene 1.3.1.c.nobenzene 1.3.1.c.nobenzene 1.4.0.c.nobenzene 1.5.4.c.nobenzene 1.5.4.c.nobenzene 1.5.4.c.nobenzene 1.5.4.c.nobenzene 1.5.4.c.nobenzene 1.5.4.c.nobenzene 1.5.4.c.nobenzene 1.5.4.c.nobenzene 1.5.4.c.nobenzene 1.5.6.c.nobenzene 1.5.6.c.nob							1	a de Total Conchessor	3000 not/ml
POPAGE 1	1.2.4 "Trachicorbengene 1.2.10; Altricohoronene 1.3.10; Altricohoronene 1.3.10; Altricohoronene 1.4.10; Altricohoronene 1.5.10; Altricohoronenene 1.5.10; Altricohoronenenenenenenenenenenenenenenenenenen	1.2.4 "Controller controller cont								Training and all all all all all all all all all al	TOOK may me
enoli il il il il il il il il il il il il i	1.2-Dichlorobencene 1.3-Dipkenylhydrazine 1.3-Dinitrobenzane 1.3-Dinitrobenzane 1.4-Dichlorobenzane 1.4-Dichlorobenzane 1.4-Dichlorobenzane 1.4-Dichlorobenzane 1.4-Dichlorophenol 2.4-S-Titchlorophenol 2.4-S-Titchlorophenol 2.4-S-Titchlorophenol 2.4-Dinitrophenol 2.4-Dinitrophenol 2.4-Dinitrophenol 2.4-Dinitrophenol 2.5-Dichlorophenol 2.6-Dinitrophenol 2.6-Dinitrophenol 2.6-Dinitrophenol 2.6-Dinitrophenol 2.6-Dinitrophenol 2.7-Dinitrophenol 2.7-Direthylhenol 2.7-Direthylphenol 2.7-Direthylphenol 2.7-Direthylphenol 2.7-Direthylphenol 2.7-Direthylphenol 3.7-Direthylphenol 3.7-Direthylphenol 3.7-Direthylphenol 3.7-Direthylphenol 3.7-Direthylphenol 3.7-Direthylphenol 3.7-Direthylphenol 3.7-Direthylphenol	1.2-Dichlorobencene 1.3-Dipkentlyddrazine 1.3-Dinitrobencene 1.3-Dinitrobencene 1.4-Dichlorobencene 1.4-Dichlorobencene 1.4-Dichlorobencene 1.4-Dichloropenene 2.3-4-Dichloropenene 2.4-Dichloropenene 2.4-Dichloropenene 2.4-Dichloropenene 2.4-Dichloropenene 2.4-Dichloropenene 2.4-Dichloropenene 2.5-Dichloropenene 2.5-Dichloropenene 2.6-Dichloropenene 3.4-Dichloropenene 3.4-								1,2,4-Trichlerobenzene	1000 ng/mr
ropane]	1.2-Oppernyllydrazine 1.3-Dirchlorobensene 1.4-Dirchlorobensene 1.4-Dirchlorobensene 1.4-Dirchloropenene 1.4-Dirchloropenene 1.4-Dirchloropenene 1.4-Dirchlorophenel 2.4-G-Trichlorophenel 2.4-G-Trichlorophenel 2.4-Dirhirophenel 2.4-Dirhirophenel 2.4-Dirhirophenel 2.4-Dirhirophenel 2.5-Dirhirophenel 3.5-Dirhirophenel 3	1.2-Dphenylhydrazine 1.3-Dichlotobenzene 1.3-Dinttobenzene 1.4-Dichlotobenzene 1.4-Dichlotopenzene 1.4-Dichlotopenzene 1.4-Dichlotopenzene 1.4-Dichlotopenzene 1.5-3,4-Direchlotophenze 1.5-4-Direchlotophenze 1.5-4-Direchlotophenze 1.5-6-Dichlotophenze 1.5-6-Dich								1,2-Dichlorobenzene	1000 ng/mr
ropane]	1.3-Dichosobensene 1.4-Dichosobensene 1.4-Dichosobensene 1.4-Dichosobensene 1.4-Dichosobensene 1.4-Dichosobensene 2.2-oxybis[1-chlotoprogne] 2.3,4,6-Teriachiorophenol 2.4-Dichorophenol 2.4-Dichorophenol 2.4-Dichorophenol 2.4-Dichorophenol 2.4-Dichorophenol 2.5-Dichorophenol 2.5-Dichorophenol 2.5-Chlotophenol 3.5-Chlotophenol 3.	13-0.chosobensene 1,3-0.nit.cobensene 14-0.chosone 14-0.chosone 14-0.chosone 13-4.6-Trichlocopenel 2,3,4,6-Trichlocopenel 2,4,6-Trichlocopenel 2,4-0.rrichlocopenel 2,4-0.rrichlocopenel 2,4-0.rrichlocopenel 2,4-0.rrichlocopenel 2,4-0.rrichlocopenel 2,4-0.rrichlocopenel 2,4-0.rrichlocopenel 2,4-0.rrichlocopenel 2,6-0.rrichlocopenel 3,74/1.rrichlocopenel 3,74/1.rr								1, 2-Diphenylhydrazine	1000 ng/mF
enol enol enol enol enol enol enol enol	1.3-Innircobensene 1.4-Duckane 1.4-Duckane 1.4-Duckane 1.2-Tuckane 2.7-Tuckinopenel 2.3-4-STrichlorophenel 2.4-STrichlorophenel 2.4-Duckane 2.4-Duckane 2.4-Duckane 2.4-Duckanel 2.4-Duckanel 2.4-Duckanel 2.4-Duckanel 2.5-Duckanel 2.5-Duckanel 2.5-Duckanel 2.5-Duckanel 2.5-Duckanel 3.4-Duckanel 3.5-Duckanel 3.5-Duckan	13-Dimitrobensene 14-Divane 14-Divane 13-Divane 13-Divane 15-Divane							1,3-Dichlorobenzene	1000 Mg/mL	
[and or or or or or or or or or or or or or	1,4-Dichlorobensee 1,4-Dichloropensee 1,4-Dichloropensee 2,7-coxybis_l-chioropense 2,3,4-G-Tirchlorophenol 2,4-G-Tirchlorophenol 2,4-Dichlorophenol 2,4-Dintrophenol 2,4-Dintrophenol 2,4-Dintrophenol 2,5-Dintrophenol 3,5-Dintrophenol 3	1,4-Dichlorobensene 1,4-Dichlorobensene 1,4-Dichloropenene 1,4-Dichloropenene 2,5'-oxybis[1-chloropenene] 2,4,6-Trichlorophenol 2,4-Dichlorophenol 2,4-Dichlorophenol 2,4-Dichlorophenol 2,4-Dichlorophenol 2,6-Dichlorophenol 3,6-Dichlorophenol								1.3-Dimitrobenzene	1000 na/ml.
100	1.4-Ploxane 1.4-Ploxane 2.7-Vobis1-Callotopopane] 2.5.4-6-Textach.coropheno] 2.4.5-Text.coropheno] 2.4-0-Text.coropheno] 2.4-0-Text.coropheno] 2.4-0-Text.coropheno] 2.4-0-Text.coropheno] 2.4-0-Text.coropheno] 2.5-0-Text.coropheno] 2.6-Dinitropheno] 2.6-Dinitropheno] 2.6-Dinitropheno] 3.4-Callotopheno] 3.4-Callotophen	1.4 - Dioxane 1.4 - Dioxane 1.5 - S S S S S S S								1 A-Ni-chlorohapsana	1000 sextal.
ropane]	1.7 stylingstalene 2.7 -oxybis[1-cthoropropal] 2.3.4 -orterationophenol 2.4.5 Trachlorophenol 2.4.5 Trachlorophenol 2.4.5 Trachlorophenol 2.4.5 Trachlorophenol 2.4.5 Trachlorophenol 2.4.5 Trachlorophenol 2.5.5 thirrophenol 2.5.5 thirrophenol 2.6.5 thirrophenol 2.6.5 thirrophenol 2.6.5 thirrophenol 2.6.5 thirrophenol 2.6.5 thirrophenol 2.7 Methylphenol 2.7 Methylphenol 2.7 Methylphenol 2.7 Methylphenol 3.7 Methylphenol	1.7 Stockers 1.7 Stockers 2.5.3,4.6.Tetrachiorophenol 2.4.5.Trichlorophenol 2.4.5.Trichlorophenol 2.4.5.Trichlorophenol 2.4.5.Trichlorophenol 2.4.5.Trichlorophenol 2.4.5.Trichlorophenol 2.4.5.Trichlorophenol 2.5.5.Trichlorophenol 2.6.5.Trichlorophenol 2.6.5.Trichlorophenol 2.6.Trichlorophenol 2.6.Trichlorophenol 2.6.Trichlorophenol 2.6.Trichlorophenol 2.6.Trichlorophenol 2.7.Trichlorophenol 2.7.Trichlorophenol 2.7.Trichlorophenol 2.7.Trichlorophenol 2.7.Trichlorophenol 3.7.Trichlorophenol 4.7.Trichlorophenol 5.7.Trichlorophenol 5.7.Trichlorophe								1 A.Di Assess	Terline Coot
ropane]	1.78ct/hlagotraleus 2.7.9.4.6-Tetrachloropropane] 2.3.4.6-Tetrachlorophenol 2.4.5-Tetrachlorophenol 2.4.6-Tetrachlorophenol 2.4-Dimethylabenol 2.4-Dimethylabenol 2.4-Dimethylabenol 2.5-Dimethylabenol 2.6-Dimethylabenol 2.6-Dimethylabenol 2.7-Chlorophenol 2.7-Chlorophenol 2.7-Methylabenol 2.7-Methylabenol 2.7-Methylabenol 2.7-Methylabenol 2.7-Methylabenol 2.7-Methylabenol 2.7-Methylabenol	1.78 C.M. Indicates 2.7.3, 4, 6-Tetrachioropropane] 2.3, 4, 6-Tetrachioropropane] 2.4, 6-Tetrachiorophenol 2.4, 6-Tetrachiorophenol 2.4-5-Tetrachiorophenol 2.4-5-Tetrachiorophenol 2.4-5-Tetrachiorophenol 2.4-5-Tetrachiorophenol 2.4-5-Tetrachiorophenol 2.5-5-Tetrachiorophenol 2.5-Chloronaphthalene 2Nethylnaphthalene 2Nethylnaphthalene 2Nethylnaphthalene 2Nethylnaphthalene 2Nethylnaphthalene								The product	TWI / DT DOOR
enol	2.4.5-Trichloropropans) 2.4.5-Trichloropropans) 2.4.5-Trichlorophenol 2.4.5-Trichlorophenol 2.4.5-Trichlorophenol 2.4-Dimitrophenol 2.4-Dimitrophenol 2.4-Dimitrophenol 2.6-Dimitrophenol 2.6-Dimitrophenol 2.6-Dimitrophenol 2.6-Dimitrophenol 2.7-Eritylnaphhalene 2Chlorophenol 2.7-Eritylnaphhalene 2Chlorophenol 2.7-Eritylnaphhalene 2Chlorophenol 2.7-Eritylnaphhalene 2Chlorophenol 2.7-Eritylnaphhalene	2, 4, 9-Tetrachioropropanej 2, 4, 9-Tetrachioropropanej 2, 4, 9-Tetrachiorophenoj 2, 4, 9-Tetrachiorophenoj 2, 4-Dinklorophenoj 2, 4-Dinklorophenoj 2, 4-Dinklorophenoj 2, 4-Dinklorophenoj 2, 4-Dinklorophenoj 2, 6-Dinklorophenoj 2, 6-Dinklorophenoj 2, 6-Dinklorophenoj 2, 6-Dinklorophenoj 3, 8-Dinklorophenoj 4, 8-Dinklorophenoj 5, 8-Dinklorophenoj 6, 8-Dinklorophenoj 7, 8-Dinklorophenoj 8, 8-Dinkloropheno								1-Methylnaphthalene	TOOO BEVIEW
eno.1	2.3.4 G-Tetrachlorophenol 2.4.5-Trichlorophenol 2.4.6-Trichlorophenol 2.4-Olrhorophenol 2.4-Olrhorophenol 2.4-Olrhorophenol 2.4-Olrhorophenol 2.5-Olrhorophenol 2.6-Olrhorophenol 2.6-Olrhorophenol 2.6-Olrhorophenol 2-Chlorophenol 2-Methylnaphthalene 2-Methylnaphthalene 2-Methylphenol 2-Methylphenol	2.3.4.6-Tetrachlorophenol 2.4.5-Titchlorophenol 2.4.6-Titchlorophenol 2.4-Dirachlorophenol 2.4-Dirachlorophenol 2.4-Dirachlorophenol 2.4-Dirachlorophenol 2.4-Dirachlorophenol 2.6-Dirachlorophenol 2.6-Dirachlorophenol 2.6-Dirachlorophenol 2.6-Dirachlorophenol 2.6-Dirachlorophenol 2.6-Dirachlorophenol 2.6-Dirachlorophenol 2.6-Dirachlorophenol 2.6-Dirachlorophenol 2.6-Methylphenol 2.7-Methylphenol 2.7-Methylphenol 3.7-Methylphenol 3.7-Methylphenol								2,2 "-oxybis I-chloropropane]	TOOM AND ME
n n n n n n n n n n n	2.4.5-Trechlorophenol 2.4.5-Trechlorophenol 2.4-Durklorophenol 2.4-Durklorophenol 2.4-Durklorophenol 2.4-Durklorophenol 2.6-Durklorophenol 2.6-Durklorophenol 2.6-Durklorophenol 2.6-Durklorophenol 2.6-Durklorophenol 2.7-Chlorophenol 2.7-Chlorophenol 2.7-Chlorophenol 2.7-Chlorophenol 3.7-Chlorophenol 3.7-Chloroph	2.4.5Trichlorophenol 2.4.5Trichlorophenol 2.4.5DrackDybenol 2.4.5DrackDybenol 2.4.5DrackDybenol 2.4.5DrackDybenol 2.6.5DrackDolumbe 2.6.5DrackDolumbe 2.6.5DrackDolumbe 2.6.5DrackDolumbe 2.6.5DrackDolumbe 2.6.5DrackDolumbe 2.6.5DrackDolumbe 2.6.5DrackDolumbe 2.6.5DrackDolumbe 2.6.5DrackDolumbe 3.6.5DrackDolumbe 3.6.5D								2, 3, 4, 6-Tetrachiorophenol	1000 ng/mL
ed ed (00 00 en jed ed jed jed jed jed	2.4.6.Treblorophenol 2.4-0.thlorophenol 2.4-0.thlorophenol 2.4-0.thlorophenol 2.4-0.thlorophenol 2.6-0.thlorophenol 2.6-0.thlorophenol 2.6-0.thlorophenol 2.6-0.thlorophenol 2.6-0.thlorophenol 2.6-0.thlorophenol 2.6-0.thlorophenol 3.6-0.thlorophenol 3.6-0.thlor	2.4.6.Trechlorophenol 2.4-0.thlorophenol 2.4-0.thlorophenol 2.4-0.thlorophenol 2.4-0.thlorophenol 2.4-0.thlorophenol 2.6-0.tchlorophenol 2.6-0.tchlorophenol 2.7-0.torophenol 2.7-0.torophenol 2.7-0.torophenol 2.7-0.torophenol 2.7-0.torophenol 2.7-0.torophenol 2.7-0.torophenol 3.7-0.torophenol 3.								2, 4,5-Trichlorophenol	1000 ng/mp
	2.4-Dichorphenol 2.4-Dimethylphenol 2.4-Dimethylphenol 2.4-Dimitrophenol 2.5-Dichorophenol 2.6-Dichorophenol 2.6-Dinitropolluene 2-Chlorophenol 2-Chlorophenol 2-Methylphenol 2-Methylphenol 2-Methylphenol 2-Mitroaniline	2.4-Outhlorophenol 2.4-Outhlorehylphenol 2.4-Outhlorophenol 2.4-Outhlorophenol 2.6-Outhlorophenol 2.6-Outhlorophenol 2.6-Outhlorophenol 2Methylphenol 2Methylphenol 2Methylphenol 2Methylphenol 3Mitrodniline								2, 4, 6-Tri chlorophenol	1000 ug/mL
	2.4-Dimethylphenol 2.4-Entitrophenol 2.4-Entitrophenol 2.6-Entitrophenol 2.6-Entitrophenol 2.6-Entitrophenol 2Chlorophenol 2Chlorophenol 2Rethylnaphthalene 2Rethylnaphthalene 2Nethylphenol 2Nethylphenol 2Nethylphenol	2.4-Dimethylphenol 2.4-Dimitrophenol 2.4-Dimitrophenol 2.6-Dichlorophenol 2.6-Dinitropluene 2-Chlorophenol 2-Chlorophenol 2-Methylphenol 2-Methylphenol 2-Methylphenol 2-Mitroaniline								2,4-Dichlorophenol	1000 ud/mL
	2.4-Innirophenol 2.4-Innirophenol 2.4-Innirophenol 2.6-Innirophenol 2.6-Innirophenol 2-Chlorophenol 2-Methylphenol 2-Methylphenol 2-Methylphenol	2,4-Dinitrophenol 2,4-Dinitrophenol 2,6-Dichlorophenol 2,6-Dichlorophenol 2-Chlorophenol 2-Chlorophenol 2-Methylphenol 2-Methylphenol 2-Methylphenol 2-Methylphenol 3-Methylphenol 3-Methylphenol 3-Methylphenol 3-Methylphenol 3-Methylphenol 3-Methylphenol								2,4-Dimethylphenol	1000 ug/mL
	2.4-Dinitrotoluene 2.6-Dinitrotoluene 2.6-Dinitrotoluene 2Chloromphthalene 2Chlorophenol 2Methylphenol 2Methylphenol 2Mitroaniline	2.4-Dinitrotoluene 2.6-Dinitrotoluene 2.6-Dinitrotoluene 2-Chlotonaphthalene 2-Chlotophenel 2-Methylaphthalene 2-Methylaphthalene 2-Methylaphthalene 3-Methylaphthalene								2,4-Dinitrophenol	2000 ng/mt
	2.6-Dichlorophenol 2.6-Dinitrophenol 2.Chlorophenol 2.Chlorophenol 2.Methylphenol 2.Methylphenol 2.Mitroaniline	2,6-Dichlorophenol 2,6-Dinitrollene 2-Chlorophthalene 2-Chlorophenol 2-McLhylnaphthalene 2-McLhylnaphthalene 2-McLhylnaphthalene 2-McLhylnaphthalene 3-Mtroaniline								2,4-Dimitrotoluene	1000 wg/mr
	2.6-Dinitrocoluene 2-Chloromaphthalene 2-Chlorophenol 2-Nethylnaphthalene 2-Nethylphenol 2-Nitroaniline	2.6-Dinittoroluene 2-Chloromaphthalene 2-Methylphenol 2-Methylphenol 2-Methylphenol 2-Methylphenol 7-Mitroaniline								2,6-Dichlorophenol	1000 uc/mL
	2-Chloronaphthalene 2-Chlorophenol 2-Methylphenol 2-Mitroaniline	2-Chloronaphthalene 2-Chlorophenol 2-Methylphenol 2-Methylphenol 2-Methylphenol 7-Mirroaniline								2,6-Dinitrotoluene	1000 ug/mt
	2-Chlorophenol 2-Methylphenol 2-Methylphenol 2-Nitroaniline	2-Chlorophenol 2-Methylndphthalene 2-Methylphenol 2-Witroanline								2-Chloronaphthalene	1000 ng/mL
alene	2-Methylphenol 2-Mitroaniline	2-Methylphenol 2-Methylphenol 2-Mitroaniline								2-Chlarophenol	1880 ng/ml.
	2-Methylphenol 2-Witroaniline	2-Methylphenol 2-Mirroaniline								2-Marthy Inaphthalana	1000 ua/mL
	2-Nitroaniline	2-Nitroanline								2-Mathylphene]	Tray out
Υ		111								2-Nitroaniline	1000 ug/mL

Job No.: 480-89467-1 Lab Name: TestAmerica Buffalo

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Job No.: 48D-89467-1

TW/En Concentration 11/13/2015 1.2,4,5-Tetrachiorobensene
1.2-1 chindrobensene
1.2-1 chindrobensene
1.2-1 chindrobensene
1.3-1 chindrobensene
1.3-1 chindrobensene
1.4-1 chindrobensene
1.4-1 chindrobensene
1.4-1 chindrobensene
1.4-1 chindrophene
2.2-2 coxytesil-chiorophene
2.3-4 chindrophene
2.4,5-Triodhorophene
2.4,5-Triodhorophene
2.4,5-Triodhorophene
2.4,5-Triodhorophene
2.4-1 chindrophene
2.4-1 chindrophene
2.4-1 chindrophene
2.4-1 chindrophene
2.5-1 chindrophene
2.5-1 chindrophene
2.6-1 chindrophene
2.6-1 chindrophene Attazine
Benzaldehyde
Caprolactam
3.3-Dichlorobenzidine
Benzidine (Surr) Analyte 25 ut 1,1'-Bipheryl Volume (Purchased Reagent) (Furchased Reagent) (Purchased Reagent) (Purchased Reagent) Patent Reagent I mL ME Listi INT D0022 Reagent ID Page 110 of 326 Reagent Final Volume 07/31/16 10/21/15 Methylene Chloride, Lot 121470 Rester, Lot A0110231 Restet, Lot A0108988 Rettek, Lot A0108989 Restel, Lot A092712 Dilutant Prep 08/31/16 07/31/16 01/12/18 08/31/16 EMP .. WB 11510 STK 00002 .. MB LISTI STK 00002 ..MB IIS9 STK 00002 .MB SURR STX 00042 Reagent ID MB LISTI WRK 00215

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

				Washington.	Parent Reagent		
Reagent ID	SMD Date	Prep	Dilutant	Final	Reagent ID Added	d Analyte	Concentration
						3-Nitrogniline	Jm/Sn-S
						4,6-Dinitro-2-methylphenol	10 ng/mp
						4-Bromophenyi phenyl ether	Tw/mr
						4-Chloro-3-methylphenol	Tud/bu &
						4-Chloroaniline	Jul/ur
						4-Chlocophenyl phenyl sther	S ng/mt
						4-Methylphenol	S wg/mc
						4-Nitroaniline	5 ug/mL
						4-Witrophenel	
						Acenaphthene	5 ng/mr
						Acenaphthylene	Ju/du S
						Acetophenone	5 ug/mt
						Antline	5 ug/mL
						Anthracene	July S
						Azobenzene	5 ug/mt
						Benzo[a]anthracene	5 uq/mL
						Benzolalnyrene	5 ucr/mL
						Benzolh/fluoranthene	5 ug/mt
						Renzole, h. dinerviene	S northic
						Bengolelfluoranthene	
						Benzvl alcohol	S vig/mt.
						Bis (2-ch proethoxy) methane	S norm.
						Bis (2-chlorosthy) ather	5 na/mt
						Ded (D. of heal hages) whereal hard	
						Bory beney whiths are	5 104/ml
						Carbagole	Julyan S
						0.0000000000000000000000000000000000000	Tuo/mi
						Dien-kettel ahthalate	S nor/mi.
						Director of the late	190767 S
						Diversity Purnature	
						Dinema (a) n/ antiniacene	Tim/Bin C
						Dipensional atthalata	S Noving
						Mechy purnaras	Time o
						Dimethyl phthalate	Ju/mr
						Dipnenylamine	0,55 ug/mL
						Finoranthere	Tw/ww. S
						ararara	THE PERSON IN
						Transacti carterantene	3 mg/mm
						THE SECULO LODGE BUILDING	This Co.
						Hewachtorocyclopentadiene	TW/Dn c
						Hexachlorosthane	S ng/mr
						Hexadedane	Jm/bw s
						Indenoll, 2, 3-dd]pyrene	a ug/mL
						Isopuctone	o ng/mr
						M. M. transport and an expensed opposite	TIM/DIN C
						M.M. Tracodinathy anima	S warrent
						M-W-troscottphony amine	10 100/101
						The same of the sa	Ton Jon St.

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REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

REAGENT TRACEABILITY SUPMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

Reagent ID Added 4.6-Dinisto-2-methylphenol 4-Eromophenyl phenyl ether 4-Chlorophenyl phenyl ether 4-Chlorophenyl phenyl ether 4-Chlorophenyl phenyl ether 4-Chlorophenyl phenyl ether 4-Nitrophenol Antrophenol Antrophenol Antrophenol Antrophenol Antrophenol Antrophenol Antrophenol Antrophenol Benool almuhacene Benool almochukacene Benool					transfer tra	Patent Reagent		
	Reagent ID	EMP	Prep	Dilutant Used	Final			Concentration
							4, 6-Dinitro-2-methylphenol	400 ug/mt
is a su							4-Bromophenyl phenyl ether	200 ug/mL
ii w							4-Chloro-3-methylphenol	200 ug/mL
ы ф п							4-Chloroaniline	200 ng/mL
an U							4-Chlorophenyl phenyl ether	200 ug/mL
n 9							4-Methylphenol	200 ng/mL
m (0)							4-Nitroaniline	200 wg/mg
an U							4-Nitrophenol	400 ng/mL
n 9							Acenaphthene	200 ug/mL
m (0)							Acenaphthylene	200 ug/mL
an U							Acetophenone	200 ug/mL
n 9							Aniline	200 ug/mt
a) (i)							Anthracene	200 ug/mL
n 9							Azobenzene	200 ng/mL
n 8							Benzo[a]anthracene	200 ng/mL
m W							Benzolalpyrene	200 ng/mL
n 19							Benzo[b]fluoranthene	200 ug/mL
n 8							Benzolg, h, 1] perylene	200 ug/mt
a) (0)							Benzo[k]fluoranthene	200 ug/mL
n 0							Benzyl alcohol	200 ug/mL
B)							Bis/2-chloroethoxy) methane	200 ug/mL
Ø							Bis(2-chloroethyl)ether	200 ug/mL
							Bis(2-ethylhexyl) phthalate	200 ng/mt
							Butyl Denzyl phthalate	200 Mg/mL
							Carbazole	200 ug/mI
							Chrysene	200 ug/mi
							Di-n-butyl phthalate	200 ug/mL
							Di-n-octyl phthalate	200 ng/mL
							Dibenz(a, h) anthracene	200 Mg/mL
							Dibenzofuran	200 ug/ml
							Diethyl phthalate	200 ng/ml
							Dimethyl phthalate	200 ug/mI
							Diphenylamine	342 ug/mL
							Fluoranthene	200 ug/m
							Fluorene	1m/fm 002
							Mexachlorobenzene	200 ug/m[
							Hexachlorobutadiene	200 ug/mi
							Hezachlorocyclopentadiene	200 ug/m
							Hewachlorosthane	200 ug/mI
							Hexadecane	200 ng/m
							Indenoil, 2,3-cdipyrene	IM/5% 607
							Isophorone	200 ug/mi
							n-Decane	MAN MOVEMENT
							N-NICEOSOGI-D-DIODYLAMIDE	ZOU UG/III
							N-Nitposodimethylamine	m/gn ng/m
							N-N1Crosodiphenylamine	400 Mg/m
							n-Octadecane	200 ug/m

11/13/2015

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REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

Total Land Land	No.:	
2	SDG N	

Reagent ID					Headent	Parent Readent	220		
Main Main	Reagent ID	EMP	Prep	Dilutant Used	Final	Reagent ID	Volume Added	Analyte	Concentration
Particular								Nitrobensere	200 ug/mt
Principle Prin								Pentachlorophenol	400 ng/mE
Particle Particle								Phenanthrene	200 ug/mL
Pyrtidine Pyrt								Phenol	200 ng/mL
12/31/16 Regret, Lot A0111954 Regret Reg								Pytene	200 ng/mL
NS_LIST_STR_00002 1000 ut 21-2-10-10-10-10-10-10-10-10-10-10-10-10-10-								Pyridine	200 ng/mL
12/31/16 Re_Lisil_sTW_00002 1000 to Architecture						ME LISTO STR DG002	1000 mr		200 Ng/mE
12/31/16 Regret, Lot A0111934 Regret 2									200 ug/mL
13/31/16 Regret, Lot A0111934 Regret, Lot A011934 Regret, Lot A011						MB LISII STK 00002	1000 m		200 ug/mt.
12/31/16 Regret, Lot A0111934 A10 ut 2								Benzaldehyde	200 ug/mL
12/31/16 Regret, Lot A0111934 (Furchased Respent)								_	250 ng/mL
12/31/16 Regret, Lot A0111924 A00 11 2.4 d=Till brougghenol						MB LISS STK DOOD2	TODD RE	_	200 ug/mt
12/31/16 Regret, Lot A0111934 Churchased Reagent)								-	200 ug/mL
12/31/16 Regret, Lot AD111934 (Eurchased Reagent) 12/31/16 Regret, Lot AD111934 (Eurchased Reagent) 12.2 Total Concentrate 12.2 Total Concentrate 12.2 Total Concentrate 13.3 Total Con						ME SURR STR 55042	400 uL		200 ng/mL
Nicrobensense=45 (Surr)								2-Fluorobiphenyi	200 ng/mr
Page the Apillog								2-Fluorophenol	200 ng/mL
Page 114 of 326 Parce page Page part Page 114 of 326									200 ug/mL
12/31/16 Regret, Lot A0111934 (Purchased Reagent) 11.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1									200 ug/mt
12/31/16 Regret, Lot A0111934 (Purchased Reagent) 1.2.4.5-Fettachlottobearsene 1.2.4.5-Fettachlottobearsene 1.2.1.6.1.6.1.6.0.0.0.0.0.0.0.0.0.0.0.0.0.0				Control of the contro				Phenol-d5	200 ug/mL
1.2.4.5—Tetrachlotochasene 1.2.1.5.4.5—Tetrachlotochasene 1.3.2—Dichlotochasene 1.3.2—Dichlotochasene 1.4.3—Dichlotochasene 1.4.4—Dichlotochasene 1.4.5—Tetrachlotochasene 1.4.5—Tetrachlotochasene 1.4.5—Tetrachlotochasene 1.4.5—Tetrachlotochasene 2.3.4.5—Tetrachlotochasen 2.4.5—Tetrachlotochasen 2.4.5—Tetrachlotochasen 2.4.5—Tetrachlotochasen 2.4.5—Tetrachlotochasen 2.4.5—Tetrachlotochasen 2.4.5—Tetrachlotochasen 2.4.5—Tetrachlotochasen 2.4.5—Tetrachlotochase 2.6—Dichlotochasen 2.6—Dichlotochasen 2.6—Dichlotochasen 2.6—Dichlotochasen 2.6—Dichlotochasen 2.6—Dichlotochasen 2.7—Struchasen 2.7 3.7 4.5—Dichlotochasen 2.7 4.5—Dichlotochasen 2.7 4.5—Dichlotochasen 2.7 4.5—Tetrachlotochasen 2.7 5.4 5.4 5.4 5.4 5.5 5.5 5.5 5.5 5.5 5.5	MB LIST STK 00023	12/31/16		Regtet, Lot A0111934		(Furchased Reag	ent}	1,1'-Biphenyi	1000 ng/mL
12.4 "Triphlocopensene 1.2.bichlocobensene 1.5-bichlocobensene 1.5-bichlocobensene 1.4-bichlocobensene 1.4-bichlocobensene 1.4-bichlocobensene 1.4-bichlocobensene 1.4-bichlocobensene 1.5.5 "-oxybasfl-chlocopropane) 2.5.4 "Triphlocophenol 2.4.6 "Triphlocophenol 2.4.6 "Triphlocophenol 2.4.6 "Dinitrophenol 2.4-binitrophenol 2.5-binitrophenol 2.6-binitrophenol 2.6-binitrophenol 2.6-binitrophenol 2.6-binitrophenol 2.7-bithlocophenol 2.6-binitrophenol 2.7-bithlocophenol 2.7-bithlocophenol 2.7-bithlocophenol 2.7-bithlocophenol 2.7-bithlocophenol 2.7-bithlocophenol 2.7-bithlocophenol 2.7-bithlocophenol 3.7-bithlocophenol								1,2,4,5-Tetrachlorobensene	1000 ug/mL
1.2-Dichlordhengue 1.3-Dinitobengue 1.3-Dinitobengue 1.3-Dinitobengue 1.4-Dichlordengue 1.4-Dichlordengue 1.4-Dichlordengue 1.4-Dichlordengue 1.5.3-4.6-Tuchlordengue 2.3-4.6-Tuchlordengue 2.4-Dimitophenol 2.4-Dimitophenol 2.4-Dimitophenol 2.4-Dimitophenol 2.6-Dimitophenol 2.6-Dimitophenol 2.6-Dimitophenol 2.6-Dimitophenol 2.6-Dimitophenol 2.6-Dimitophenol 2.6-Dimitophenol 2.6-Dimitophenol 2.7-Mitophenol 2.7-Mitophenol 2.7-Mitophenol 2.7-Mitophenol 2.7-Mitophenol 2.7-Mitophenol 2.7-Mitophenol 3.7-Mitophenol 3.7-Mitophenol 3.7-Mitophenol 4.6-Dimito-2-methylphenol 4.6-Dimito-2-methylphenol 4.6-Dimito-2-methylphenol 4.6-Dimito-2-methylphenol								1,2,4-Trichlorobensene	1000 ug/mL
1.2-Diphenylbydrazine 1.3-Dinitodenzane 1.3-Dinitodenzane 1.4-Dichlotobenzane 1.4-Dichlotobenzane 1.4-Dichlotobenzane 1.4-Dichlotopenzane 2.2.4-Divane 2.4-Dinitophenol 2.4-Dinitophenol 2.4-Dinitophenol 2.4-Dinitophenol 2.4-Dinitophenol 2.6-Dinitophenol 2.6-Dinitophenol 2.6-Dinitophenol 2.6-Dinitophenol 2.7-Dinitophenol 3.7-Dinitophenol 3.7-Dini								1,3-Dichlorobenzene	1000 ng/mt
1.3-Dichlorobensene 1.4-Dichlorobensene 1.4-Dichlorobensene 1.4-Dichlorobensene 1.4-Dichlorobensene 1.4-Dichlorobensene 1.4-Dichlorobensene 1.4-Dichloropenol 2.4-Orthoropenol 2.4-Orthoropenol 2.4-Dichlorophenol 2.4-Dichlorophenol 2.4-Dinitrophenol 3.4-Dinitrophenol 2.4-Dinitrophenol 3.4-Dinitrophenol 4.5-Dinitrophenol 3.4-Dinitrophenol 3.4-Dinitrophenol 3.4-Dinitrophenol 4.5-Dinitrophenol 5.4-Dinitrophenol							1,2-Diphenylhydrazine	1000 Mg/mL	
1.3-Dinitobenseee 1.4-Dicklorobenseee 1.4-Dicklorobenseee 1.4-Dicklorobensee 1.4-Dickloropropane 2.2-Cookloropropane 2.3-Cookloropropane 2.4-Dinitophenol 2.4-Dinitophenol 2.4-Dinitophenol 2.4-Dinitophenol 2.4-Dinitophenol 2.4-Dinitophenol 2.4-Dinitophenol 2.4-Dinitophenol 2.5-Dinitophenol 2.5-Dinitophenol 2.5-Dinitophenol 2.5-Dinitophenol 2.5-Dinitophenol 2.5-Nethylphenol 2.7-Nethylphenol 2.7-Nethylphenol 2.7-Nethylphenol 2.7-Nethylphenol 2.7-Nethylphenol 3.7-Nethylphenol 3.7-Nethylphenol 4.6-Dinito-2-methylphenol 4.6-Dinitop-2-methylphenol 4.6-Dinitop-2-methylphenol								1,3-Dichlorobenzene	1000 ug/mL
1.4-Dichlorobencene 1.4-Dichlorobencene 1.4-Dickloropenene 2.2.4-Carghasfl-chloropenene 2.3.4-Firschlorophenol 2.4-Firschlorophenol 2.4-Dimetpylphenol 2.4-Dimitropoluene 2.4-Dimitropoluene 2.6-Dimitropoluene 2.6-Dimitropoluene 2.6-Dimitropoluene 2.6-Dimitropoluene 2.7-Benylphenol 2.7-Benylphenol 2.7-Benylphenol 2.7-Benylphenol 2.7-Benylphenol 2.7-Benylphenol 2.7-Benylphenol 3.7-Benylphenol 3.7-Benylphenol 3.7-Benylphenol 4.8-Dimitro-2-methylphenol 4.8-Dimitro-2-methylphenol								I,3-Dinitrobensene	1000 ug/mt
1.4-Doxane 1.4-Doxane 1.4-Structural control of the								I, 4-Dichlorobenzene	1000 ug/mL
1-Wethylnghthalane 2,2'-oxykas[1-chloropropane] 2,3,4'-oxykas[1-chloropropane] 2,3,4'-oxykas[1-chloropropane] 2,4'-0rinthorophenol 2,4-Dintrophenol 2,4-Dintrophenol 2,4-Dintrophenol 2,4-Dintrophenol 2,4-Dintrophenol 2,4-Dintrophenol 2,4-Dintrophenol 2,4-Dintrophenol 2,4-Dintrophenol 2,5-Dintrophenol 2,5-Dintrophenol 2,5-Dintrophenol 2,5-Nethylphenol 2,7-Netroaniline 2,Nitrophenol 2,Nitrophenol 3-Nitrophenol 4,6-Dintro-2-methylphenol 4,6-Dintro-2-methylphenol 4,6-Dintro-2-methylphenol								1,4-Dioxane	1990 ng/mF
2,2'-cxybisfl-chloropropase) 2,34,6-Terachlorophenol 2,4,6-Trachlorophenol 2,4-6-Trachlorophenol 2,4-0-Interpylphenol 2,4-0-Interpylphenol 2,4-0-Interpylphenol 2,4-0-Introphenol 2,6-0-Introphenol 2,6-0-Introphenol 2,6-0-Introphenol 2,6-0-Introphenol 2-Nethylphenol 2-Nethylphenol 2-Nethylphenol 2-Nethylphenol 2-Nethylphenol 3-Nitrophenol 3-Nitrophenol 2-Nitrophenol 3-Nitrophenol 3-Nitrophenol 4,6-0-Introphenol 3-Nitrophenol 3-Nitrophenol 4,6-0-Introphenol 5-Nitrophenol 5-Nitrophenol 6-Nitrophenol 7-Nitrophenol 7-Nitrophenol 8-Nitrophenol 8-Nitrophenol 9-Nitrophenol								1-Methylnaphthalene	1000 Mg/mL
2.3,4.6-Tetrachlotophenol 2.4.5-Truchlotophenol 2.4.5-Truchlotophenol 2.4.5-Truchlotophenol 2.4.5-Truchlotophenol 2.4.5-Dinitrophenol 2.4-Dinitrophenol 2.6.5-Dinitrophenol 2.6-Dinitrophenol 2.6-Dinitrophenol 2.6-Dinitrophenol 2.7-Dinitrophenol 2.7-Dinitrophenol 2.7-Dinitrophenol 2.7-Dinitrophenol 3.7-Dinitrophenol 3.7-Dinitrophenol 3.7-Dinitrophenol 3.7-Dinitrophenol 4.6-Dinitrophenol 3.7-Dinitrophenol 4.6-Dinitrophenol 5.7-Dinitrophenol 5.7-Dinitrophenol 6.7-Dinitrophenol 6.7-Dinitrophenol 7.7-Dinitrophenol 6.7-Dinitrophenol 7.7-Dinitrophenol 6.7-Dinitrophenol 7.7-Dinitrophenol								2,2'-oxybis[1-chloropropane]	1000 ug/mL
2,4,5-Trachlorophenol 2,4,5-Trachlorophenol 2,4-Dimethylphenol 2,4-Dimethylphenol 2,4-Dimitrophenol 2,4-Dimitrophenol 2,4-Dimitrophenol 2,4-Dimitrophenol 2,5-Dimitrophenol 2,5-Dimitrophenol 2,5-Dimitrophenol 2,7-Ohnorophenol 2,7-Ohnorophenol 2,7-Ohnorophenol 2,7-Ohnoromiline 2,7-Ohnoromiline 2,7-Ohnoromiline 2,7-Ohnoromiline 2,7-Ohnoromiline 2,7-Ohnoromiline 4,6-Dimitro-2-methylphenol 4,6-Dimitro-2-methylphenol 4,6-Dimitro-2-methylphenol								2, 3, 4, 6-Tetrachlotophenol	1000 ng/mL
2.4.6-Traichlorophenol 2.4-Dimethylphenol 2.4-Dimethylphenol 2.4-Dimitropolation 2.4-Dimitropolation 2.6-Dimitropolation 2.6-Dimitropolation 2.6-Dimitropolation 2.6-Dimitropolation 2.6-Dimitropolation 2.7-Dimitropolation 2.7-Dimitropolation 2.7-Dimitropolation 2.7-Dimitropolation 2.7-Dimitropolation 2.7-Dimitropolation 3.7-Dimitropolation 4.6-Dimitropolation 4.6-Dimitropolation 4.7-Dimitropolation 4.5-Dimitropolation 4.7-Dimitropolation 4.5-Dimitropolation 4.5-Dimitropolation 4.7-Dimitropolation 4.5-Dimitropolation 4.7-Dimitropolation 4.7-D								2,4,5-Trachlorophenol	1000 ug/mL
2.4-Dichlocophenol 2.4-Dinitrophenol 2.4-Dinitrophenol 2.4-Dinitrophenol 2.4-Dinitrophenol 2.6-Dinitrophenol 2.6-Dinitrophenol 2.6-Dinitrophenol 2.7-Chlocophthalene 2.7-Chlocophthalene 2.7-Chlocophthalene 2.7-Chlocophthalene 3.7-Chlocophthalene 3.7-Chlocophthalene 4.6-Dinitrophenol 3.7-Chlocophenol 4.6-Dinitrophenol 5.7-Chlocophenol 6.7-Chlocophenol 7.7-Chlocophenol 7.7-Chlocophenol 7.7-Chlocophenol 7.7-Chlocophenol 7.7-Chlocophenol 7.7-Chlocophenol								2,4,6-Trichlorophenol	1000 ng/mL
2.4-Dimethylphenol 2.4-Dimethylphenol 2.4-Dimitophenol 2.4-Dimitophenol 2.6-Dimitophenol 2.6-Dimitophenol 2Chlorchighthalene 2Chlorchighthalene 2Nethylphenol 2Nethylphenol 2Nethylphenol 2Nethylphenol 3Nitophenol 3Nitophenol 4.6-Dimito-2-methylphenol 4.6-Dimito-3-methylphenol 4.5-Dimito-3-methylphenol								2,4-Dichlorophenol	1900 ug/mL
2.4-Dinitrophenol 2.4-Dinitropluene 2.6-Dicalprophenol 2.5-Dinitrophenol 2-Chlorophenol 2-Methylnaphthalene 2-Methylnaphthalene 2-Mitchylnaphthalene 2-Mitchylnaphthalene 2-Mitchylnaphthalene 2-Mitchylnaphthalene 3-Mitchylnaphthalene 4.6-Dinitro-2-methylphenol 4-Bromophenyl phenyl ether								2,4-Dimethylphenol	3000 ug/mt
2.4-Dinitionchuene 2.6-Dinitionchuene 2.6-Dinitionchuene 2.6-Dinitionchuene 2.6-Dinitionchuene 2.6-Dinitionchuene 2.4-Enthylphenel 2.4-Enthylphenel 2.4-Enthylphenel 3.4-Enthylphenel 4.6-Dinitionchuenel 4.6-Dinitionchuenel 4.5-Dinitionchuenel 4.5-Dinitionchuenel 4.5-Dinitionchuenel 4.5-Dinitionchuenel 4.5-Dinitionchuenel 4.5-Dinitionchuenel 4.5-Dinitionchuenel 4.5-Dinitionchuenel 4.6-Dinitionchuenel 4.6-								2,4-Dinitrophenol	2000 ng/mr
2.6-Difficultions 2.6-Oinitrocoluene 2Chloconghihalene 2Chloconghihalene 2Nethylnghihalene 2Nethylnghihalene 2Nethylnghihalene 2Nitropanilne 2Nitropanilne 2Nitropanilne 4.6-Dinitro-2-methylphenol 4.6-Dinitro-1-methylphenol 4.5-Dinitro-1-methylphenol								2,4-Dinitrotoluene	1000 ng/mL
2.6-Dinitrotoluene 2-Chloromphikalene 2-Chloromphikalene 2-Methylnsphthalene 2-Methylphenol 2-Mitroanilne 2-Nitroshenol 3-Nitroshenol 4.6-Dinitro-2-methylphenol 4-bromophenyl phenyl ether								2,6-Dichlorophenel	1000 ug/mL
2-Chlocomphibalene 2-Chlocophenol 2-Methylphenol 2-Methylphenol 2-Mitroaniline 2-Mitroaniline 4,6-Dinitro-2-methylphenol 4-Bromophenyl phenyl ether								2,6-Dinitrotoluene	1000 ng/mL
2-Chlorophenol 2-Methylnghubalene 2-Methylphenol 2-Nitropaniline 2-Mitrophenol 3-Nitrophenol 4.6-Dinitro-2-methylphenol 4.bromophenyl phenyl ether								2-Chloronaphthalene	1000 ng/mr
2-Methylnsphthalene 2-Methylphenol 2-Nitrophenol 3-Nitrophenol 4-6-Dimitro-2-methylphenol 4-bromophenyl phenyl ether								2-Chlorophenol	1000 wg/mL
2-Methylphenol 2-Mitroaniline 2-Mitroshenol 3-Mitroshenol 4.8-Dinitro-2-methylphenol 4-Bromophenyl phenyl ether								2-Wethylnaphthalene	1000 nd/mr
2-Nitroanilne 2-Nitrophenol 3-Nitroanilnol 4,6-Dinitro-2-methylphenol 4-Bromophenyl phenyl ether								2-Methylphenol	1000 ug/mt.
2-Witcophenol 3-Nutboaniline 4,6-Dinitro-2-methylphenol 4-Eromophenyl phenyl ether								2-Nitroaniline	1000 ug/mL
3-Nithosonline 4,6-Dimitro-2-methylphenol 4-Bromophenyl phenyl ether								2-Nitrophenol	1000 ng/mL
4,6-Dimitro-2-methylphenol 4-Bromophemyl phemyl ether								S-Nithogniline	1000 ug/mt
4-Bromophenyl phenyl ether								4,6-Dinitro-2-methylphenol	2000 ug/mL
								4-Bromophenyl phenyl ether	IDOO WG/WE
					Dane 111	of 306			4414312045
					מאמנו	0.020			0102010

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

Volume					-	Patent Reagent			
4-Chloro-3-methylphenol 4-Chloropaniline 4-Chloropaniline 4-Mattylphenol 4-Mattylphenol 4-Mattylphenol Avattyphenol Avattyphenol Avattyphenol Acetaphthylene Acetaphthylene Acetaphthylene Acetaphthylene Acetaphthylene Acetaphthylene Acetaphthylene Acetaphthylene Acetaphthylene Acetaphthylene Benzolginiline	Reagent ID	EMD	Prep	Dilutant	Final	Reagent ID	Volume	Analyte	Concentration
4-Chloropaniline 4-Chloropaniline 4-Rethylphenol 4-Rethylphenol 5-Retophenol Aceraphthene Aceraphthene Aceraphthene Aceraphthene Aceraphthene Aceraphthene Aceraphthene Antine Benzo[a]anhthacene Benzo[b]flucranthene Benzo[b]flucranthene Benzo[a]anhthacene Benzo[a]anhthacene Benzo[b]flucranthene Benzo[a]anhthacene Benzo[c]flucranthene Bis[2-chlorocetholy]phthalate Dibenzo[c]ahlanthace Dibenzo[c]ahlanthace Dibenzo[c]ahlanthace Dibenzo[c]ahlanthace Diphenylanthe Elucranthene Hexachlorocethane Hexachlorocethane Hexachlorocethane Hexachlorocethane Hexachlorocethane Hexachlorocethane Hexachlorocethane Hexachlorocethane Howeldechene NANtrosodlyhenylanthe Dichenzeleche Maphthalene Maphthalene Matrobenzene Matropene Matrobenzene Matrobenzene Matrobenzene Matrobenzene Matrobenzene Matrobenzene Matrobenzene Matrobenzene Matrobenzen								4-Chloro-3-methylphenol	1000 ng/mt
4-Chlorophenyl phenyl ether 4-Matronilline A-Matrophenol Actiophenol Anilibe Antibue Benzo[a]anbhacene Benzo[a]anbhacene Benzo[a]anbhacene Benzo[a]anbhacene Benzo[a]alabhacene Benzo[a]alabhacene Benzo[a]alabhacene Benzo[a]alabhacene Benzo[a]alabhacene Benzo[a]alabhace Bis[2-ch]atocebyllether Bis[2-ch]atocebyllether Bis[2-ch]atocebyllether Bis[2-ch]atocebyllether Dibenzofuran D								4-Chloroaniline	1000 ug/mL
4-Metbylphenol 4-Mitroghenol 4-Nitroghenol Acenaghthylene Acenaghthylene Acenaghthylene Acenaghthylene Acenaghthylene Acenaghthylene Acenaghthylene Acenaghthylene Acenaghthylene Acenaghthylene Acenaghthylene Acenaghthylene Acenaghthylene Acenaghthylene Benzo[a]anthracene 1000 Benzo[a]luvcranthene 1000 Benzo[a]luvcranthene 1000 Benzo[a]luvcranthene 1000 Benzo[a]luvcranthene 1000 Bis[2-chloroethoxy)methane 1000 Bis[2-chloroethoxy]methal 1000 Charbacle Bis[2-chloroethox] Bis[2-chloroethox] Inchessale Inc								4-Chlorophenyl phenyl ether	1000 ng/mL
4-Nitropatiline 2000 Acengybthylene 2000 Acengybthylene 1000 Acengybthylene 1000 Acengybthylene 1000 Acengybthylene 1000 Acengybthylene 1000 Benzo[a]pyrene 1000 Benzo[a]pyrene 1000 Benzo[a]pyrene 1000 Benzo[a,h]perylene 1000 Dibenzolene 1000 Bexachlorocyclenadine 1000 Hexachlorocyclenadine 10000 Hexachlorocyclenadine 1000 Hexachlorocyclenadine 1000 Hexa								4-Methylphenol	1000 ng/mr
Acetaghthene 1000 Acetaghthylene 1000 Acetaghthylene 1000 Anthracene 1000 Anthracene 1000 Benzo[alpytene 1000 Bis[c-chylhenyl] phthalate 1000 Chrysene 1000 Chrysene 1000 Chrysene 1000 Chrysene 1000 Dibenzo[alpytene 1000 Dibenzo[alpytene 1000 Dibenzo[alpytene 1000 Dibenzo[alphylene 1000 Bisharachlorobhradiene 1000 Hexachlorobradiene 1000 Hexachlorochende 1000 Hexachlorochende 1000 Hexachlorochende 1000 Hexachlorochene 1000 Hexachlorochene 1000 Hexachlorochene 1000 Mayhtuslene 100								4-Nitroaniline	1000 ug/mL
Acengohthylene								4-Nitrophenoi	2000 ng/mL
Acenaphthylene Acetophenone Addithe Additheracene Additheracene Additheracene Additheracene Benzofalapyrene Benzofalanthracene Benzofyliluscanthene Benzofyliluscanthene Benzofyliluscanthene Benzofyliluscanthene Benzofyliluscanthene Benzofyliluscanthene Benzofylinexyliphthate Bisfe-chlorosthoxylmethare Bisfe-chlorosthoxylmethare Bisfe-chlorosthoxylmethare Bisfe-chlorosthoxylmethare Bisfe-chlorosthoxylmethare Bisfe-chlorosthoxylmethare Bisfe-chlorosthoxyliphthate Bisfe-chloro								Acenaphthene	1000 Ng/mL
And the particle and the fact control of the f								Acenaphthylene	1000 ug/mL
Aniine Antine Antheacene Benze(alanthracene 1900 Benze(alanthracene 1900 Benze(alanthracene 1900 Benze(alanthracene 1900 Benze(alacthracene 1900 Benze(alacthracene 1900 Benze(alacthracene 1900 Benze(alacthracene 1900 Bis(2-chlorocethoxy)methate 1900 Bis(2-chlorocethoxy)methate 1900 Bis(2-chlorocethox)methate 1900 Bis(2-chlorocethox)methate 1900 Chresc(alacthracene 1900 Di-racty) phthalate 1900 Di-racty phthalate 1900 Di-racty phthalate 1900 Di-racty phthalate 1900 Di-racty phthalate 1900 Di-racty phthalate 1900 Di-racty phthalate 1900 Di-racty phthalate 1900 Di-racty phthalate 1900 Di-racty phthalate 1900 Di-racty phthalate 1900 Di-racty phthalate 1900 Di-racty phthalate 1900 Di-racty phthalate 1900 Bishanylamine 1900 Hexachlorocethane 1900 M-Nitrosodimethylamine 1900 M-Nitro								Acetophenone	1000 ng/mr
Antheacene Antheacene Benzo(alpyrene Benzo(alpyrene Benzo(alithoranthene 1000 Benzo(alithoranthene 1000 Benzo(alithoranthene 1000 Benzo(alithoranthene 1000 Benzo(alithoranthene 1000 Benzo(alithoranthene 1000 Benzo(alithoranthene 1000 Benzo(alithoranthene 1000 Chrysene 1000 Dibenzo(a,h) anthracene 1000 Berachlorocheradiene 1000 Hexachlorocheradiene 1000 Hexachlorochera								Aniline	1000 ug/mL
Benzo[alptrene Benzo[Anthracene	1880 ug/mL
Benzo(alanthracene 1000 Benzo(a) Ilvoranthene 1000 Benzo(a,h,liperylene 1000 Benzo(a,h,liperylene 1000 Benzo(a,h,liperylene 1000 Benzo(a,h,liperylene 1000 Benzo(a,h,liperylene 1000 Bis(2-chloroethoxy)methane 1000 Bis(2-chloroethoxy)methane 1000 Carbazole 1000 Carbazole 1000 Carbazole 1000 Carbazole 1000 Carbazole 1000 Carbazole 1000 Chreso(a,h)anthracene 1000 Dibenzo(a,h)anthracene 1000 Bexachloroene 1000 Hexachloroene 1000 Maxiltosodimethylamine 1000								Azobenzene	1000 ug/mL
Benzo[alloranthene 1000 Benzo[alloranthene 1000 Benzo[alloranthene 1000 Benzo[alloranthene 1000 Benzo[alloranthene 1000 Benzo[alloranthene 1000 Benzo[alloranthene 1000 Benzo[alloranthene 1000 Benzo[alloranthene 1000 Butyl benzyl phthalate 1000 Chrysne 1000 Dibenz[alloranthene 1000 Dibenz[alloranthene 1000 Dibenz[alloranthene 1000 Dibenz[alloranthene 1000 Benzo[alloranthene 1000 Benzo[alloranthene 1000 Benzolanthene 1000								Benzo(a) anthracene	1000 ug/mL
Benzo(p) fluoranthene 1000 Benzo(f, fluoranthene 1000 Benzo(f, fluoranthene 1000 Benzo(f, fluoranthene 1000 Bis(2-ch) croethyl ether 1000 Bis(2-cthylhexyl) phthalate 1000 Chrysene 1000								Benzo[a]pyrene	1000 ug/mL
Benzo[g.h.liperylane 1900 Benzo[g.h.liperylane 1900 Benzy[.alcohol Bis[2-ch]orcethowy)methane 1900 Bis[2-ch]orcethowy)methane 1900 Bis[2-ch]orcethowy)methane 1900 Bis[2-ch]orcethow] phthalate 1900 Carbazole 1900 Carb								Benzo[b]fluoranthene	1000 ng/mL
Bengefkfilworanchene 1000 Bis (2-chloroethoxy)methane 1000 Bis (2-chloroethoxy)methane 1000 Bis (2-chloroethoxy)methane 1000 Carbacole Buryl bengyl phthalate 1000 Chrysene 1000 Dibensfan lanthracene 1000 Branchlanine 1000 Hexachlorobycloperadiene 1000 Hexachlorocycloperadiene 1000 Hexachlorocycloperadiene 1000 Hexachlorocycloperadiene 1000 Hexachlorocycloperadiene 1000 Manitrosodimethylamine 1000 Manitrosodimethylamine 1000 Machialene 1000								Benzolg, h, ilperylene	1000 ug/mL
Bensyl alcohol Bis (2-chlotoethoxy)methane Bis (2-chlotoethy) ether Bis (2-chlotoethy) ether Bis (2-chly)hexyl phthalate Butyl bensyl phthalate 1000 Chrysene Di-n-ckyl phthalate 1000 Di-n-ckyl phthalate 1000 Dibens(a,h) authracene 1000 Dibens(a,h) authracene 1000 Dibens(a,h) authracene 1000 Dibens(a,h) authracene 1000 Elencthene Elucenthene 1000 Elucenthene Elucenthene 1000 Hexachlorobusadiene 1000 Hexachlorocyclopenadiene 1000 Hexachlorocyclopenadiene 1000 Indeno(1,2,3-cd]pyrene 1000 Maxitroscdin-n-propylamine 1000 N-Nitroscdin-n-propylamine 1000 N-Nitroscdin-n-pro								Benzolkifluoranthene	1000 uc/mL
Bis[2-chlotoethoxy)methane 1900 Bis[2-chlotoethyl] phthalate 1900 Cabbacole 1900 Cabbacole 1900 Chrysene 1900 Chrysene 1900 Chrysene 1900 Di-n-buty] phthalate 1900 Di-n-buty] phthalate 1900 Dibenzofatan 1900 Dibenzofatan 1900 Dibenzofatan 1900 Dibenzofatan 1900 Dibenzofatan 1900 Dibenzofatan 1900 Dibenzofatan 1900 Dibenzofatan 1900 Dibenzofatan 1900 Dibenzofatan 1900 Diphenylamine 1900 Hexachlotoethane 1900 Hexachlotoethane 1900 Hexachlotoethane 1900 Mexachlotoethane 1900 Hexachlotoethane 1900 Mexachlotoethane 1900 Hexachlotoethane 1900 Mexachlotoethane 1900 Mexachl								Benzyl alcohol	3000 ug/mL
Bis (2-chylhesyl) ether 1000								Bis (2-chloroethoxy) methane	Jm/5n.600I
Bis (2-ethylhesyl) phthalate 1000 Earbacle 1000 Chrysene 1000 Di-n-bryl phthalate 1000 Di-n-ocryl phthalate 1000 Di-n-ocryl phthalate 1000 Dibens(a,h) anthracene 1000 Dibens(a,h) anthracene 1000 Dibens(a,h) anthracene 1000 Dimethyl phthalate 1000 Dimethyl phthalate 1000 Dimethyl phthalate 1000 Dimethyl phthalate 1000 Distryl phthalate 1000 Elucenthene 1000 Hexachlorobradiene 1000 Hexachlorobradiene 1000 Hexachlorochane 1000 Hexachlorochane 1000 N-Nitrosodinethylamine 1000 Naphthalene 1000 Naphthalene 1000 Entachlorophenol 1000								Bis(2-chloroethyl)ether	1000 ug/mL
Cabbacle Chirache Chi								Bis/2-ethylhemyl) phthalate	1000 na/mL
Chipsole								Buryl benzyl phthalate	1000 ug/mL
Unityeane								Carbazole	1000 ng/mt
Di-n-butyj phthalate 1990 Di-n-ocyty phthalate 1900 Dibenzofaran 1900 Dibenzofaran 1900 Dibenzofaran 1900 Dibenzofaran 1900 Diphenylamine 1900 Elucene 1900 Elucene 1900 Elucene 1900 Hexachlorobenzene 1900 Manterosodinethylamine 1900 Maphthalene 1900 Herchlorophenol 1900 Herchlorophenol 1900 Herchlorophenol 1900 Herchlorophenol 1900								Chrysene	1000 Mg/mL
Di-b-ocyj phthalate 1000 Dibensiah hanthracene 1000 Dibensiah hanthracene 1000 Dibensiah ate 1000 Dibensiah e 1000 Elucene Elucene 1000 Elucene Hexachlorobensene 1000 Hexachlorobensene 1000 Hexachlorobensene 1000 Hexachlorocyclopentadiene 1000 Hexachlorochane 1000 Hexachlorochane 1000 Hexachlorochane 1000 Marachlorochane 1000 N-Nitrosodinethylamine 1000 N-Nitrosodinethylamine 1000 N-Nitrosodinethylamine 1000 N-Nitrosodinethylamine 1000 N-Nitrosodinethylamine 1000 N-Octadecane 1000 Naphthalene 1000 Naphthalene 1000 Naphthalene 1000								Di-n-baty phthalate	1000 ng/ml.
Dibens(a,h)authracene 1900 Dibens(a,h)authracene 1900 Dischyl, phhalate 1900 Dishenylamine 1900 Dishenylamine 1900 Elucenthene 1900 Elucenthene 1900 Hexachlorobusadiene 1900 Hexachlorochusadiene 1900 Hexachlorochusadiene 1900 Hexachlorochuse 1900 Hexachlorochuse 1900 Hexachlorochuse 1900 Hexachlorochuse 1900 Hostadecane 1900 NANtrosodinethylamine 1900 Naphthalene 1900 Naphthalene 1900 Naphthalene 1900 Natrobessene 1900								Di-n-actvi nhthalate	1000 ng/mf.
Dibensoftran 1900								Dibenz(a, h) anthracene	1000 ng/mL
Dimethyl Dithalate 1000 Dimethyl Dithalate 1000 Diphemylamine 1000 Elucene 1000 Elucene 1000 Elucene 1000 Hexachloroburadiene 1000 Hexachlorocyclopentadiene 1000 Hexachlorocyclopentadiene 1000 Hexachlorocyclopentadiene 1000 Hexachlorocyclopentadiene 1000 Hexachlorocyclopentadiene 1000 Hexachlorocyclopentadiene 1000 New Scholoroche 1000								Dibancofuran	Table ner/ml.
Dimethyl phristate 1000								District opthalate	1000 uc/ml.
Internationary Internationary								Dimethyl phthalate	1000 ng/mL
Fluctant 1900 Fluctent 1900 Fluctent 1900 Hexachlorobenzene								Diphenylamine	1710 uc/mL
Finorene 1000 Hexachlorobenzene 1000 Hexachlorobytadiene 1000 Hexachlorobytadiene 1000 Hexachlorocyclopentadiene 1000 Hexachlorochane 1000 Hexachlorochane 1000 Indeno[1,2,3-cd]pyrene 1000 Indeno[1,2,3-cd]pyrene 1000 N-Nitrosodinethylamine 1000 N-Nitrosodinethylamine 1000 N-Nitrosodinethylamine 1000 N-Ottadecane 1000 N-								Fluoranthene	1000 ug/mL
Hexachlorobensene 1000 Hexachlorobradiene 1000 Hexachlorochradiene 1000 Hexachlorochrade 1000 Hexachlorochrade 1000 Hexachlorochrade 1000 Indeno[1,2,3-cd]pyrene 1000 Indeno[1,2,3-cd]pyrene 1000 N-Nitrosodinethylamine 1000 N-Nitrosodipherylamine 1000 N-Octadecane 1000 Maphthalene 1000 Maphthalene 1000 Maphthalene 1000 Maphthalene 1000 Maphthalene 1000 Maphthalene 1000								Fluorene	1000 uq/mL
Hexachlorobutadiene								Hexachiorobenzene	1000 ug/mL
Hexachlorocyclopentadiene								Hexachlorobutadiene	3000 ug/mt
Hexactlorocthane Hexactlorocthane Hexactlorocta Indeno[1, c. 3-cd]pyrene Isophorone In-Decane N-Mitrosodimethylamine N-Mitrosodimethylamine N-Mitrosodimethylamine N-Mitrosodimethylamine N-Mitrosodimethylamine N-Mitrosodimethylamine N-Mitrosodimethylamine N-Mitrosomizane Mitrosomizane Pentachiotophenol								Mexachlotocyclopentadiene	Tuyon nd/mT
Hexadocane Indeno[1, 2, 3-cd]pyrene Isophorone Isophorone N-Mitrosodi-n-propylamine N-Mitrosodimethylamine N-Mitrosodimethylamine N-Mitrosodiphenylamine N-Mitrosodiphenylamine N-Mitrosodiphenylamine N-Mitrosodiphenylamine Potradedme								Hexachloroethane	Jm/gu 0001
Indenoil, Z, 3-cdjpyrene Isoghorone Dedane N-Mitrosodi-n-propylanine N-Mitrosodipherylanine N-Mitrosodipherylanine N-Mitrosodipherylanine N-Mitrosodipherylanine N-Mitrosodipherylanine P-Mohitralene Machinelene Mitrobensene								Hexadecane	1000 ug/mL
Isophorcane n-Decame N-Mitrosodin-propylamine N-Mitrosodinethylamine N-Mitrosodiphenylamine N-Mitrosodiphenylamine n-Octadecame Naphthalene Mitrobenzane Pentachiorophenol								Indeno[1, 2, 3-cd]pyrene	1000 ug/mL
In-Decame W-Nitrosodin-propylamine N-Nitrosodinethylamine N-Nitrosodinethylamine N-Nitrosodinethylamine N-Octadecane Nagbitalene Nagbitalene Natchensene Pentadhiorophenol								Isophorone	1000 ng/mh
N-Nitrosodi-n-propylamine N-Nitrosodinethylamine N-Nitrosodiphenylamine N-Nitrosodiphenylamine N-Octadecane Nachtalene Nachtalene Natrosensene Pentachiorophenol								n-Decane	1000 wg/mL
M-Mitrosodimethylamine N-Mitrosodiphenylamine n-Ottadecane Naphtralene Naphtralene Nattrobansene Pentachiotophenol								N-Nitrosodi-n-propylamine	1000 ng/mL
N-Nitrosodiphenylamine n-Octadecane Nagotralene Nitrobensche Netrobensche								M-Mitrosodimethylamine	1000 ug/mt
n-Octadecane Naphthalene Nitrobenzene Pentachiorophenol								N-Nitrosodiphenylamine	2000 ng/mL
Marbitalene Nittobsmehe Pentachiotophenol								n-dotadecane	1000 ng/mF
Mitrobspacese Pentachlorophenol								Naphthalene	1000 wg/mt
Pentachiorophenol								Nitrobenzene	1000 ug/mL
								Pentachlorophenol	2000 ng/mL
3000 PT 1000					077	000			A STATE OF THE PARTY OF THE PAR

REAGENT TRACEABILITY SUMMARY

Job No.: 480-89467-1 Lab Name: TestAmerica Buffalo

REAGENT TRACEABILITY SUMMARY

Jap No.: 480-89467-1 Lab Name: TestAmerica Buffalo SDG No.:

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Job No.: 480-89467-1

Volume Reagerr ID Added Analyte Concentration Prices Prices Prices 20 ug/mL		
Pyrens Pyrens	Used	Date Used
10 mt MB 1781 SPK_00023		
10 mt MB_LIEL_STR_00023		
Indexes		
Annable Benasher Bena		
10 mL MB_LIST_STW_00023		
10 mt MB_Lier_SFR_00023		
10 mt, MB_LISI_STW_00023		
2.4.6-This componence of Sturi Prompthen 1 2-Eluorophen 1 2-Eluorophen 1 2-Eluorophen 1 3-Eluorophen 1 3-Eluoro		
10 mL MB_LIST_STW_00023		
10 mL MB_LISI_STR_ON023		
10 mL MB_LIST_STW_00023		
10 mt MB_List_STR, 2002 at Lit_Sipheny! 1.2.4.5.Tetrachlorobensene 1.2.Dichlorobensene 1.2.Dichlorobensene 1.3.Dichlorobensene 1.4.Dichlorobensene 1.4.Dichlorobensene 1.4.Dichlorobensene 1.4.Dichlorobensene 1.4.Dichlorobensene 1.4.Dichlorobensene 1.4.Dichlorobensene 1.4.Dichlorobensene 1.4.Dichlorobensene 1.4.Dichlorophenol 2.4.G-Trichlorophenol 2.4.G-Trichlorophenol 2.4.G-Trichlorophenol 2.4.G-Trichlorophenol 2.4.Dinklorophenol 2.4.Dinklorophenol 2.6.Dichlorophenol 2.6.Dichlorophenol 2.6.Dichlorophenol 2.6.Dichlorophenol 2.6.Dichlorophenol 2.6.Dichlorophenol 2.6.Dichlorophenol 2.6.Dichlorophenol 2.7.Colocophenol 2.7.Colocophenol 2.7.Colocophenol 2.7.Colocophenol 2.7.Colocophenol 2.7.Colocophenol 3.7.Colocophenol 3.7.Colocophe		
10 mL MB_LIST_STM_00023 2000 qt 1.1."-Biphenyl Lordensene 1.2.4.Tuchlorobensene 1.2.5.Tuchlorobensene 1.3.10.10.00000000000000000000000000000		
1.2,4,5-Tetrachlorobensene 1.2,4-Thichlorobensene 1.3-Dipheryllydrasine 1.3-Dipheryllydrasine 1.3-Dipheryllydrasine 1.4-Dichlorobensene 1.4-Dichlorobensene 1.4-Dichlorobensene 1.4-Dichlorobensene 1.4-Dichlorobensene 1.4-Dichlorobensene 1.4-Dichlorophenol 2.4-Dichlorophenol 2.4-Dirthlorophenol 2.4-Dinthlorophenol 2.4-Dinthlorophenol 2.4-Dinthlorophenol 2.4-Dinthlorophenol 2.4-Dinthlorophenol 2.4-Dinthlorophenol 2.4-Dinthlorophenol 2.4-Dinthlorophenol 3.4-Dinthlorophenol 3.4-Dinthlor	dene chi	16 10/09/15 Methylene Chloride, Lor
Odne] oluminol		2 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
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Oane] Olimoi Noi		
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REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 48D-89467-1

				Headent	Pacent Reagent		
Reapent ID	EMP	Prep Date	Dilutant	Final	Reagent ID Added	a Analyte	Concentration
						4-Chlorophenyl phenyl ether	200 ug/mL
						4-Methylphenol	200 ug/mE
						4-Nitroaniline	200 ug/mL
						4-Nitrophenol	dag ng/mL
						Acenaphthene	200 ug/mL
						Acenaphthylene	200 ng/mL
						Acetophenone	200 wg/mL
						Aniline	
						Anthracene	200 ng/mL
						Azobenzene	200 ug/mL
						Benzolalanthracene	250 ug/mL
						Benzolalpyrene	200 ud/mL
						Benzo[b]fluoranthene	200 ug/mL
						Benzo[g,h,i]perylene	200 ng/mL
						Benzo[k]fluoranthene	200 ug/mL
						Benzyl alcohol	200 ug/mL
						Bis(2-chloroethoxy)methane	200 ug/mL
						Bis(3-chlocoethyl)ether	200 ug/mt
						Bis(2-ethylhemyl) phthalate	200 uc/mL
						Butyl bensyl phthalate	200 ug/mL
						Carbazole	200 na/mL
						Chrysene	200 ug/mL
						Di-n-Entvl phthalate	200 ng/mt
						Di-rooctyl phthalate	200 Met/mL
							200 ng/ml.
						Dibenzofuran	200 ug/mt
						Diethyl phthalate	200 ug/mL
						Dimethyl phthalate	200 ug/mL
						Diphenylamine	342 ug/mL
						Fluoranthere	200 ug/mL
						Fluorene	200 ug/mL
						Hexachlorobenzene	200 ug/mL
						Hexachlorobutadiene	200 ng/mL
						Hexachlonocyclopentadiene	200 ug/mL
						Hexachloroethane	200 ug/mt
						Mexadecane	200 ug/mL
						Indens[1, 2, 3-cd]pyrene	200 ug/mL
						Isophorone	200 ug/mL
						n-Decane	200 ug/mL
						N-Nitrosodi-n-propylamine	200 ng/mL
						M-Nittoscdimethylamine	200 ng/mr
						N-Nitrosodiphenylamine	400 ug/mL
						n-Octadecane	200 ng/mt
						Naphthalene	200 ng/mL
						Nitrobenzene	250 ng/mL
						Pentachlorophenol	JM/DN NG/ML
						Phenanthrene	200 ug/mL
						Phenol	200 000

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REAGENT TRACEABILITY SUMMARY

Jap No.: 480-89467-1	
RestAmerica Buffalo	
Lab Name: I	SDG No.:

				Toggent	Patent Reagent	2.5		
Reagent ID	SMD	Prep	Dilutant Dsed	Final	Reagent ID	Volume Added	Analyte	Concentration
							Pytrene	200 ag/mt
				Ī			Pyridine	200 ud/mL
					MB LISIO STR D0002	7000 nF	-	200 ug/mL
					1			200 ug/mL
					MB LISII STK D0002	3000 ul	Attazine	200 ng/mL
							Benzaldehyde	200 ng/mL
							_	200 Ng/mL
					MB L189 STK 00002	1000 nl	3,3'-Dichlorobenzidine	200 ug/mL
							Benzidine.	200 ng/mt.
					MB SURR STR 00042	400 ul	2,4,6-Tribromophenol	200 ug/mL
							2-Fluorobiphenyl	250 ug/mL
								200 ug/mt
							- 1	200 ug/mL
							p-Terphenyl-dl4 (Surr)	200 ng/mL
MR 11S1 STE BBB33	13/31/16		Reather Test MO311934		(Tunchased Readent)	ent)	1 3'-Einhanul	1000 no/mt
	1 11					-	1.2.4.5-Tetrachlorobenzene	1000 ug/mL
							1.2.4-Trichlordbenzene	3000 ng/mt
							1,2-Dichlorobenzene	1000 ug/mL
							1,2-DiphenyIhydrazine	1000 ng/mL
							1,3-Dichlorobensene	1000 ng/mr
							1,3-Dinitrobenzene	1000 ug/mL
							1,4-Dichlorobenzene	1000 ng/mt
							1,4-Dioxane	1000 Mg/mL
							1-Methylnaphthalene	1000 ug/mL
							2,2'-oxybis[I-chloropropane]	1000 ug/mL
							2, 3, 4, 6-Tetrachiorophenol	1000 ug/mL
							2,4,5-Trichlorophenol	1550 ng/mF
							2,4,6-Trichlorophenol	1000 Mg/mL
							2,4-Dichlorophenol	1000 ug/mL
							2,4-Dimethylphenol	1000 ng/mL
							2,4-Dinitrophenol	2000 ug/mL
							2,4-Dinitrotoluene	1000 ng/mL
							2,6-Dichlorophenol	ISON UG/ML
							2,6-Dinitroluene	3000 ug/mL
							2-Chloronaphthalene	1000 nd/mr
							2-Chlorophenol	1000 ug/mL
							2-Methylnaphthalene	1000 ng/mr
							2-Methylphenol	1000 ng/mF
							2-Nitroamiline	1000 ng/mr
							2-Nittophenol	1000 wg/mL
							3-Nitroaniline	1000 ng/mL
							4,6-Dinitro-2-methylphenol	2000 ng/mt
							4-Bromophenyl phenyl ether	1000 ng/mL
							4-Chloro-3-methylphenol	1000 nd/mr
							4-Chloroaniline	1000 ng/mt
							4-Chlorophenyl phenyl ether	1000 ug/mL
							4-Methylphenol	Tuyon nd/mr
				Page 120 of 326	of 326			11/13/2015
				-00				/ . >

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Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

tato	
TestAmerica But	
Namer	No.:
Lab	SDG

Respont ID Take Direct Volume Respont ID Volume Adailyte Grossstriction Take Direct Direc					+ management	Success of the succession of t			
1000 1000 1000 1000 1000 1000 1000 100	Reagent ID	EMP	Prep	Dilutant Used	Final		l'ume dded	Analyte	Concentration
2,000 1,000							177	-Nitrogniline	1000 ug/m
1000 1000 1000 1000 1000 1000 1000 100							à	Artrophezol	2000 44/m
1000 1000 1000 1000 1000 1000 1000 100							त	enaphthene	1000 ug/m
1000 1000 1000 1000 1000 1000 1000 100							ď	renaphthylene	1000 ng/m
1000 1000 1000 1000 1000 1000 1000 100							d	cetophenome	1000 ug/m
1000 1000 1000 1000 1000 1000 1000 100							er.	niline	1000 ng/m
1000 1000 1000 1000 1000 1000 1000 100							K	nthracene	1000 Mg/m
1000 1000 1000 1000 1000 1000 1000 100							西	zobenzene	
1000 1000 1000 1000 1000 1000 1000 100							m	enzo[a]anthracene.	1000 ug/m
1000 1000 1000 1000 1000 1000 1000 100							m	enzo[a]pyrene	1000 ug/m
1000 1000 1000 1000 1000 1000 1000 100							m	enzo[b]fluoranthene	1880 ug/m
1000 1000 1000 1000 1000 1000 1000 100							m	snzo[g,h,i]perylene	
1000 1000 1000 1000 1000 1000 1000 100							m	enzo[k]fluoranthene	
1000 1000 1000 1000 1000 1000 1000 100							M	enzyl alcohol	1000 ng/m
1000 1000 1000 1000 1000 1000 1000 100							m	is (2-chloroethoxy) methane	1000 ng/m
1000 1000 1000 1000 1000 1000 1000 100							m	is(2-chloroethyl)ether	1000 ng/m
19000 19000							49	is (2-ethylhexyl) phthalate	2000 ug/m
1000 1000 1000 1000 1000 1000 1000 100							m	ityl bensyl phthalate	3000 ug/m
1000 1000 1000 1000 1000 1000 1000 100							U	arbazole	1000 ug/m
1000 1000 1000 1000 1000 1000 1000 100							O)	Tysene	1000 ug/m
1000 1000 1000 1000 1000 1000 1000 100							9	i-n-butyl phthalate	1000 ng/m
1000 1000 1000 1000 1000 1000 1000 100							0	i-n-octyl phthalate	1000 ug/m
1900 1900 1900 1900 1900 1900 1900 1900							O	ibens (a, h) anthracene	
							0	ibenzofuran	
							A	iethyl phthalate	1000 ug/m
							A	imethyl phthalate	1000 ug/m
							A	iphenylamine	1710 ug/m
							Ezi	Inoranthene	1500 ng/m
							lu	luorene	1000 Mg/m
							田	sxachlorobenzene	
							国	exachlorobutadiene	1000 ng/m
							щ	exachlorocyclopentadiene	1000 mg/m
							щ	exachloroethane	1000 ng/m
							T.	exadecane	1000 ug/m
							H	ndeno[1, 3, 3-cd]pyrene	1000 ug/m
							1	sophorone	1000 nd/m
							d	-Decame	1000 ug/m
							N	-Nitrosodi-h-propylamine	1000 ug/m
phenylamine e phenol							N	-Nitrosodimethylamine	1000 ug/m
e Phenol							Z	-Nitrosodiphenylamine	2000 ug/m
phenol							d	-Octadecane	1000 Mg/m
erne orophenol							×	aphthalene	1000 ug/m
orophenol rene							Z	trobensene	1000 ug/m
rene							D ₄	entachlorophenol	2000 ug/m
							DI I	nenanthrene	1000 nd/m
							Du I	Touat	1000 Mg/m
							in i	vrene	1000 ug/m

Job No.: 480-89467-1 Lab Name: TestAmerica Buffalo

ME_LISIL_STW_00002 09/3ME_LISIL_STW_00002 09/3ME_LISIL_STW_00002 09/3ME_LISIL_STW_00002 07/3	ENG PI Date Do 09/31/16 09/31/16 01/12/18	Prep Date 721/15 M	Prep Dilutant Date Rester, Lot A0108989 Rester, Lot A0110231 Rester, Lot A0310231 Rester, Lot A095712 Rester, Lot A095712 10/21/15 Methylene Chloride, Lot 121410	reagent Final Volume	Reagent ID Added (Furchased Reagent)		Concentration 2000 ug/mL 2000 ud/mL
2 2 2 2		21/15 14	Rettek, Lot A0108988 Rettek, Lot A0109389 Restek, Lot A0110231 Restek, Lot A092712 Rethylene Chloride, Lot		(Furchased Reagent)	Benzoic acid	
2 2 2		21/15	Rester, Lot A0108989 Rester, Lot A0110231 Rester, Lot A092712 Methylene Chloride, Lot		(Furchased Reagent)		
2 2 2		21/15 1	Restex, Lot A0108989 Restex, Lot A092712 Restex, Lot A092712 Rethylene Chloride, Lot 121470		(Eurchased Reagent)	Indene	
0 0		21/15 B	Restex, Lot A092712 Restek, Lot A092712 Wethylene Chloride, Lot			Atrazine Rental delvde	2000 ug/mL 2000 ug/mL
0 0		21/15 H	Restex, Lot A092712 Restek, Lot A092712 Wethylene Chloride, Lot			Caprolactam	2000 uq/mL
123		21/15 H	Restek, Lot A092712 Wethylene Chloside, Lot		(Furchased Reagent)	3,3'-Dichlorobenzidine	2000 ng/mL
2		17/15	Restek, Lot A092712 Wethylene Chloride, Lot			Benzidine	2000 ng/mE
		21/15 1	Wethylene Chloride, Lot		(Purchased Reagent)	2,4,6-Tribromophenol	5000 ug/mL
		21/15 18	Wethylene Chloride, Lor			2-Fluorobiphenyl	5000 ng/mt
		21/15 N	Wethylene Chloride, Lot			2-Fluorophenol	2000 ng/mr
		21/15 1	Wethylene Chloride, Lot 121470			Nitrobenzene-d5 (Surr)	2000 ng/mF
		21/15 1	Methylene Chloride, Lot			p-Terphenyl-dl4 (Surr)	5000 ng/mp
Ī		21/15 H	Methylene Chloride, Lot 121470			- 1	7m/6n 0008
		1	015777	-	one MB Listl INT 00022 25	250 ul 1.1'-Biphenyl	20 ng/mr
						1, 2, 4, 5-Tetrachlorobenzene	50 ug/mL
						1, 2, 4-Trichlorobenzene	
						1,2-Dichlorobenzene	50 ug/mL
						1,2-Diphenylhydrazine	50 ug/mL
						I.3-Dichlorobenzene	7m/dn 250 nd/mp
						1,3-Dimitrobenzene	SO ug/mL
						1,4-Dichlorobenzene	Jm/6n 05
						1,4-Dioxane	50 ng/mL
						I-Methylnaphthalene	
						2,2'-oxybis[1-chloropropane	ne]
						2, 3, 4, 6-Tetrachlorophenol	
						2, 4, 5-Trichlorophenol	Jm/So og/mp
						2,4,6-Trichlorophenol	7m/5n 65
						2,4-Dichlorophenol	Tm/mn 50 ng/mr
						2,4-Dimethylphenol	50 ng/mF
						2,4-Dinitrophenol	100 ug/mL
						2,4-Dimitrotoluene	50 ng/mr
						Z, 6-Dichlorophenol	July DS
						2, 6-Dinitrofoluene	So ug/mL
						2-Chloronaphthalene	So ug/mt
						2-Culorophenol	SO UG/ME
						2-Methylnaphthalene	20 ng/mL
						7-Methylphenol	SO NGYME
						2-Nitroaniline	Jm/bn OS
						2-Nitrophenol	50 ug/mL
						3-Nitroentline	20 ng/mr
						4,6-Dimitro-2-methylphenol	100
						4-Bromophenyl phenyl ether	50
						4-Chloro-3-methylphenol	50 ng/mL
						4-Chloroaniline	
						4-Chlorophenyl phenyl ether	Tm/bn os. zer
						4-Methylphenol	50 ug/mL
						4-Nitroaniline	50 ng/mL

Jap No.: 480-89467-1

Lab Name: TestAmerica Buffalo

SDG No.:

Concentration

		7		Hearent	Patent Reagent	ent	
Reagent ID	EMP	Prep Date	Dilutant	Final	Reagent ID	Volume	Analyte
							A-Nitrophesol Acengabithene Acengabithene Acengabithene Acengabithene Acengabithene Acengabitylene Aniine Aniine Aniine Aniine Aniine Aniine Aniine Aniine Benzole Jaucanthene Benzole Jilotanthene Benzole, Liperylene Benzole, Liperylene Benzole, Liperylene Benzole, Liperylene Benzole, Liberylene Benzole, Libersene Energene Dimethyl phthalate Energedene Energedene Fexachlorobenzene Hexachlorobenol Fexachlorophenol Pennanthrepe Mattrialene Mittobensene Pennanthrepe Pennanthrepe Pennanthrepe Pennanthrepe Pennanthrepe Pernen Bennanthrepe

100 ng/m/ 50 ng/m/

11/13/2015

REAGENT TRACEABILITY SUPMARY

Lab Name: TestAmerica Buffalo Jop No.: 48D-89467-1

SDS No.:

Exp Date	15 Methyle 121470	Dilutant Used Used Chloride, Lot	To mt. M	dame Reagent ID 10 mL ME_LISI_STR_00023	Volume Added	Analyte Indene Attaine Baraidehyde Captolaceam Baraidine Baraidine Baraidine Captor Averam Baraidine	Concentration 50 mg/mL 50 mg/mL
07/33/16	16 Methyle 121470	ne Chlomide, Lot	IV mb. M	8_L131_STR_00023	7n 0002	Indena Attazine Attazine Barasidehyde Captolactam 3.3Dichlorobenzidine Barazidine 4.4.FTL bromophenol	50 ng/mb
61731/16	15 Methyle 121470	ne Chlomids, Lor	TO mt. M	8_L131_STS_00023	7n 0002	Attaile Benzildebyde Benzildebyde 33.9.ochlotobenziline Benzilde 4.4.Fill bromophenol	50 ng/mb
07/33/18	15 Methyle 121470	ne chlomide, Lor	TO DE	8_L131_STS_00023	2000 nF	Arcazine Benzaldehyde Caprolaceam 3,3'-Dichlorobenzidine Benzidine 4,4,6-Titlorophenol	50 vg/mb
07731/16	15 Wethyle	ne chloride, Lor	TO mt. Wi	F_L131_STR_00023	2000 nF	BantaLdebyde Esprojaceán 3.3."-Dichlorchenzidine Benzidine 4.4.FTERIOROPHENOI	- Stranger
	15 Methyle 121470	ne chloride, Lor	10 mb N	6_L131_STS_00023	7n 0002	Caprolactam 3,3'-Dichlotobenzidine Benzidine 2,4,6-Filbromophanol	American Services
07/33//16	15 Methyle 121470	ne Chlomide, Lot	IV mb.	8_L191_STR_00023	2000 uL	3,3"-Dichlorobenzidine Benzidine 2,4,6-Tilbromophenol	50 ng/mL
07731/16	15 Methyle 121470	ne chloride, Lor	TO mt. Wi	8 L181 STR 00023	2000 uL	Senzidine 2,4,6-Tribromophanol	50 ug/mL
01/31/18	15 Methyle 121470	ne chloride, Lor	TO mb. No.	6_L131_ST\$ 00023	7n 0002	2, 4, 6-Tribiomophenol	50 ng/mr
61/31/16	15 Methyle 121470	ne chloride, Lot	TO BL M	F.L131_STR_00023	2000 uL	digital physical printers	20 vg/mg
07731/16	15 Methyle	ne chloride, Lor	TO mil.	8-1191 STR 00023	2000 uL	Z = C = HOCKEN TRIBUNG =	50 ug/mL
01/31/16	15 Methyle 121470	ne chloride, Lor	10 of M	8_L131_ST%_00023	2000 uL	2-Fluorophenel	50 ug/mt
01/31/16	15 Methyle	ne Chloride, Lor	TO ELL	F.L131_STR_00023	2000 uL	Nicrobenzene-dS (Surr)	50 ug/mL
07/31/16	121470	ne Chlomide, Lor	10 mL	e_List_srs_00023	2000 nr	p-Terphenyl-dl4 (Surr)	7m/6n 05
01/31/16	15 Methyle 121470	ne Chlomids, Lor	10 mL M	8_L181_STR_00023	2000 uL		50 ug/mL
	Ô./ \$4777					1,1'-Biphenyi	200 ug/mL
						A S. S. H. Hartmann J. A. C. B.	200 september
						1 9 definited on benefit	San agymen
						A D. D. Shi Shi Shi Shi Shi Shi Shi Shi Shi Shi	1m/ 5m 5000
						1, 3-11 COLOCODED SERVE	TIM / Dr. DO2
						1, 2-Diphenyihydrazine	200 ug/mL
						I, 3-Dichlorobenzene	200 ug/mL
						1,3-Dinitrobenzene	200 ug/mi.
						1.4-Dichlerobenzene	200 ug/mL
						1,4-Dickane	200 ng/mL
						1-Methylnaphthalene	200 Ag/mL
						2,2 "-cxvbis l-chloropropane	200 uq/mL
						2, 3, 4, 6-Tetrachlorophenol	200 uc/mb
						2.4.5-Trichlorophenol	200 ug/mL
						2.4.6-Trichlorophenol	290 ng/mL
						2.4-Dicalorophenol	200 ag/mL
						2.4-Birnethylphenol	200 ng/ml.
						2.4-Dinitrophenol	400 ng/mL
						2.4-Dinitrotoluene	200 ug/mL
						2.6-Dichlorophenol	200 ug/mL
						2.6-Dinitrotoluene	200 ug/mL
						2-Chloronaphthalene	200 ng/mt
						2-Chlorophenol	200 ug/mL
						2-Methylnaphthalene	200 ug/mL
						2-Methylphenol	200 ug/mL
						2-Nitroaniline	200 ug/mL
						2-Nitrophenoi	200 ng/mL
						S-Nitroamiling	200 werking
						d. 6-Dinitro-2-methylphenol	400 ng/ml.
						4-Rromonhenvi abenul ather	Jay world.
						4-Chloro-3-methylphenol	200 NG/mL
						4-Chloboaniline	200 ag/mL
						4-Chlorophenyl phenyl ether	200 ug/mL
						4-Methylphenol	200 ug/mL
						4-Nitroaniline	200 ud/mL
						4-Nircophenol	400 ug/ml.

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REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 48D-89467-1

				100000000000000000000000000000000000000	Patent Readent			
Reapent ID	EMp	Prep	Dilutant	Final	Reagent ID	Volume Added	Analyte	Concentration
							One and the face of	Control of the Control
							Acenabhthene	7 m / 50 m o 7
							Acenaphthylene	7007 mg/mp
							Acetophenone	200 ug/mL
							An line	200 ug/mL
							Anthracene	200 ug/mL
							Asobensene	200 ng/mt
							Owner of the Carlotte of the C	Contract State
							Beligo a dichiacelle	JIII / 50 00 2
							Hensola pyrene	200 ug/m
							Benzo[b]fluoranthene	200 hg/mL
							Benzold, h, ilperylene	200 uq/mL
							Benzolklilnoranthene	250 ng/ml.
							Banavi alachal	300 sextest.
							Daniel and American Company	Day and Odd
							BIS(3-CUTOTOECHONY) methane	Tu / Sn noz
							Bis(2-chloroethy1)ether	200 ng/mL
							Bis(2-ethylhesyl) phthalate	200 ng/mL
							Rutyl benzyl nhthalate	200 no/mL
							Carbara la	Taylor COC
							Carpagore	11/51 009
							Chrysene	200 ng/mr
							Di-n-butyl phthalate	Z00 ng/m2
							Di-n-octyl phthalate	200 ug/mL
							Dibeneda, Nianthracene	200 wormt.
							District of the contract of th	my more of the
							DESCRIPTION	TIM OOF
							Diethyl phthalate	200 ng/mt
							Dimethyl phthalate	200 Mg/mL
								S42 ma/ml.
							Themselven	Jackson COC
							all or amenance	That one
							rinorene	THI/BR DOZ
							Hexachlorobenzene	280 ug/mL
							Hexachlonobutadiene	200 ug/mL
							Hexachlorocyclopentadiene	200 ug/mL
							Hexachloroethane	200 ng/mL
							Hexadecane	200 ug/mL
							Indenof1, 2, 3-od pyrene	200 ug/mL
							Isopharone	200 uc/mL
							п-пресяпе	200 pg/mt.
							M-W++rosodi-m-wronwlamina	200 wa/ml.
							N We have a second in propy taments	Division of the
							N-Nithosodimetrylamine	200 ug/mt
							N-NICLOSOGIBHERATGHINE	dud ug/mt
							n-Gottadecane	200 ug/mL
							Naphthalene	200 ng/mL
							Mitrobenzene	Tu/bw 002
							Pentachlorophenol	400 uc/mL
							Dhehanthrene	SAG WAYME.
							orada	200 na/mL
							Direction	Sala mar/ml.
							Direction of the Control of the Cont	300 uzv/mt.
				12	COCCO SINCE OF STATE OF	2000	rythine	200 Mg/mm
				2	Ė	The cont		And ug/mil
							and hit	in / figure Compa

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 48D-89467-1

Recogning Date Dilutory Stand Produce Produc
RE_11ST1_STR_00002
NE_LISE_STE_DOOR_2
NE_LIASE_STR_DONO2
NE_DNRS_STR_00002 100 to 10 27.5-1010-1010-0010-0111-011-011-011-011-01
NE_SIMES_SIME_SIMES AND LOG AND LOG AND LOG
NE_SHE_STEPS 400 to 10_24 of STEPS 200 All Color of Step 200 All Color
12/31/16
Nitroderson-65. 200
12/31/16
12/31/16 Regree, Loc 60111934 (Suprimased Reagent)
12/31/16 PagteR, Lot 50111934 (Emphased Reagent) 1.1 - 15.05 1.2 1.0 1.2 1.0 1
12/31/15 Peetrol. 1.7 - Englanger 1000 1.2 -
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REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

			Readent	Patent Reagent	agent		
Reapent ID	EMp Date	Prep	Dilutant Final	Reagent ID	Volume	Analyte	Concentration
						Acetophenone	1000 ag/mt
						Aniline	1000 ng/mF
						Anthracehe	1000 nd/mT
						Azobenzene	1000 ng/mL
						Benzo[a]anthracene	1000 ug/mL
						Benzolalpyrene	1000 ng/mp
						Benyofh) Fluoranthene	
						Daniel of the Contract of the	Parties occur
						Benzolg, ny 1, pery tene	TOTAL MEDIUM
						Bengo [k] fluoranthene	1000 ng/mL
						Benzyl alcohol	1000 nd/mr
							1880 nor/ml.
						the state of the s	during cook
						Bis(2-ethylhexyl) phthalate	1000 ud/mL
							TOOK WOLL
						parks beneat burnarana	dulyga over
						Carbazole	1000 ng/mL
						Chrysene	1000 ng/mI.
						The section of the best of the section of the secti	
						DI-n-Duryl purnalare	TOOK ME/ME
						Di-n-octyl phthalate	3000 uq/mL
						Division/a blantbrodone	TODO: worker
						Directo (a, u) anturacene	This against
						Dibenzofuran	1000 ng/mT
						Diethyl phthalate	1000 navmi
						Dimpthyl whthe oto	Total server
						Dimetnyl paragre	TOOD MEY ME
						Diphenylamine	1710 ng/mt
						Fluoranthene	TODO WOYINT
						Fluorana	3000 net/ml.
						Topoodi lovohomanno	
						decada to to the ment	The party of the p
						Hexachlorobutadiene	TOOR BELLET
						Mexachlorocyclopentadiene	1500 ng/mL
						Hexachlonoethane	1000 Mg/mL
						Hexadecane	1000 ng/mL
						Indeno[1, 2, 3-od]ovrene	1000 ng/mL
						Tsonhorone	1000 ng/ml.
						100000	1000 mar/mt
						W. W. Proposition of the Commerce of the Comme	July cont
						NAME DOSOUT - HIJE CODY THREE	THE PROPERTY OF THE PARTY OF TH
						N-Nitrosodimethylamine	1000 ng/mr
						N-Nithosodiphenylamine	Zooo ng/mE
						n-Octadecane	1000 uq/mL
						Nanhtital phe	1000 worms.
						Wittelangana	SOOD server
						A CONTRACTOR	THI COURT
						February	2000 nd/mr
						Phenanthrene	1000 wg/mr
						Phenol	
						*Vrene	TOOK BOYME
			The same of the sa	The second secon		Pyridine	1000 ug/mL
MB LISTO STK 00002	08/31/16		Sester, Lot AUI08988	(Furchased Reagent)	(eagent)	Benzoic acid	2000 ug/mL
						Indene	2000 ug/mL
MB 11811 STK 00002	31/45/30		0004404 1.04 004000	Thereas Sessionis	(Pagent)	14 10 0 1 10 0	The Control of the Party
	240		DESTREY TO BOT DOGS	THE PERSON AND ADDRESS OF THE PERSON ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON ADDRESS OF THE PERSON ADDRESS OF THE PERSON ADDRESS OF THE PERSON AND ADDRESS OF THE PERSON ADDRESS OF THE PERSON A	The state of the s	AUTOSTIC	TIE / DR DOOZ

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REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Job No.: 480-89467-1

EXE	Dix a	Prep	+445.44	Nedgen.		100		
	0.75	Date	Dsed	volume	Reagent ID	Wolume	Analyte	Concentration
							Capiclactem	2000 ug/mL
	91/18//0		Restek, Lot AdilU231		(Furchased Reagent)	ent)	3,3'-Dichlorobenzidine	2000 ug/mL
	2000						Benzidine.	2000 tg/mL
	97/77		Rester, Lot AUGELLS		(Functional Seagent)	enti	Z.4, b-TLIDEOMODDREGOL	
							2-ginologipheny.	THIND DOOR
							- 11	addd ngymr
	Ī						p-Terphenyl-d14 (Surr)	2000 ug/mL
							Phenol-d5	5000 ug/mt.
MB_LIST1_WRK_00218 07/3	07/31/16 1	10/21/15	Nethylene Chloride, Lor	I mt N	DAL ME LISTI INT 00022	400 ut	1,1Biphenyl	30 kg/mL
			1214/0				1 2 a G. Terrach orchange	SO northal
							1 2 defreching probanges	BO MOVINE
							1 Outling Constitutions	SO norder
							7 O. Dimbowy hadroning	Bry nov/mt
							a o so the section was a section with the section of the section with the section was a section with the section with the section of the section was a section with the section of the sec	Total and Co
							1 3-Dinitrohensene	Tur/ou or
							A A District Constitution	MI Son On
							I.4-Ulcaloropensene	SO NG/INL
							1,4-Dioxane	80 ug/mL
							1-Methylnaphthalene	Jm/pm 08
							[3,2 -oxybis[1-chloropropane]	30 ng/mL
							2, 3, 4, 6-Tetrachlorophenol	Jm/pp. 08
							3 d. s. Tri chi oronhanol	Sto worker
							2 4 K-Thrack oronhand	An war at
							A A CO. AND ADDRESS OF THE PARTY OF THE PART	The Co
							z, a premorphenor	THI / BI DO
							c. 4-Dimerny phenoi	20 EG/INL
							2,4-Dinitrophenol	Two nd/un
							Z, 4-Dinitrotoluene	Tul/mr
							2,6-Dichierophenel	Tul/bn os
							2,6-Diritrotoluene	80 ug/mL
							2-Chicronaphthalene	an ug/mL
							2-Chlorophenol	an ug/mL
							2-MethyInaphthalene	Jul/6n, 08
							2-Methylphenol	80 ug/mL
							2-Witnoshiline	30 ng/mr
							2-Nitrophenol	80 ug/mL
							3-Nitroaniline	80 ng/mr
							4,6-Dinitro-2-methylphenol	160 ag/mL
							4-Bromophenyl phenyl ether	Tm/6n 08
							4-Chloro-3-methylphenol	30 ng/mL
							4-chioroaniline	80 ug/mL
							4-Chlocophenyl phenyl ether	80 ug/mL
							1-Mathyinhanol	80 vg/mL
							N-Workstone - Page	10/10x 08
							4 Wetnorhouse	Te/m 201
							Trees on hith one	Tall warfall
							Accounting to	TW/W OF
							Acetophenyteme	SO ver/ml.

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

	Reagent	and the same			
Dilutant	Final	Reagent ID	Volume	Analyte	Concentration
				Aniline	30 uq/mp
				Anthracene	80 ng/mp
				Asobenzene	30 nd/mr
				Benzo[a]anthracene	30 ng/mL
				Benzolalpyrene	ao ug/mL
				Bensolb) Linoranthene	au ugy mi
				Benzo Gil, Liperylene	80 ve/ml.
				Bengvi alcohol	80 ug/mt.
				Bis (2-chloroethoxy) methane	80 uq/mL
				Bis(2-chloroethyl)ether	Am/ug/mL
				Bis(2-ethylhexyl) phthalate	80 ng/mp
				Butyl benzyl phthalate	30 ug/mL
				Carbazole	30 ng/mL
				Chrysene	30 ng/mT
				Di-n-Duryl puthalare	SO REYME
				Diherala blanthraces	SO ver/mt
				Dibenzofuran	80 ad/mL
				Diethyl obthalate	30 ng/mL
				Dimethyl phthalate	80 Na/mL
				Diphenylamine	136,8 uq/mL
				Flooranthene	80 ng/mt
				Fluorene	30 Mg/mL
				Hexachlorobenzene	80 ug/mL
				Hexachlorobutadiene	30 ug/mt.
				Hexachlorocyclopentadiene	80 ng/mL
				Hexachloroethane	30 ng/ml.
				Hexanecane	80 Mg/mL
				Indeno(1, 2, 3-cd)pyrene	80 ug/mL
				auotopoor	30 ug/mr
				M-W-trongedt-m-propertions	80 ug/mr
				N-Nithosodimethylamine	30 ug/mL
				N-Mitrosodiphenylamine	160 ug/mL
				n-Octadecane	Jm/5n 08
				Naphthalene	30 ng/mr
				Nitrohensene	SQ ug/mL
				Pentachlorophenol	160 ug/mL
				Phenanthrene	30 ng/mL
				Phenol	30 u.g/n
				Pyrene	30 ng/mL
				Fyridine	Jm/du os
				Benzoic acid	80 ttg/mL
				Indene	30 ug/mL
				Atrazine	30 vg/mL
				Benzaldehyde	30 ug/mL
				Caprolactam	Jm/pn 08

Jap No.: 480-89467-1

Lab Name: TestAmerica Buffalo

SDG No.:

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				107317	Parent Reagent	12		
Reagent ID	EMT	Prep	Dilutant	Final	Reagent ID	Volume	Analyte	Concentration
							3,3'-Dichlorobenzidine	80 ng/mt
							Benzidine	30 ng/mp
							2,4,6-Tribromophenol	30 nd/mr
							2-Fluorobiphenyl	30 ng/mt
							2-Fluorophenol	ao ug/mL
								30 ng/mp
							p-Terphenyl-dl4 (Surr)	Ju/5% 08
MB List INT 00022	07/31/16		10/09/18 Methylene Chloride, Lot	Tu ot	TO ME ME LIST STK D0023	2000 ul	I,1'-Biphenyl	200 ug/mt.
0			121470				000	
							1,2,4,5-Tetrachlorobenzene	2.00 kg/mL
							1,2,4-Trichlorobenzene	200 ug/mL
							1,2-Dimbowofhudmoring	Talen one
							1 3-71 ch orchonore	300 da/mt.
							1.3-Dinitrobenzene	200 ud/mL
							1,4-Dichlorobensene	200 ud/mL
							1,4-Dioxane	200 ug/mL
							1-Methylnaphthalene	200 ug/mL
							2,2"-oxybis[1-chloropropane]	200 ug/mL
							2,3,4,6-Tetrachlorophenol	200 ug/mL
							2,4,5-Trichlorophenol	200 ug/mb
							2,4,6-Trichlorophenol	200 AG/mL
							2,4-Dichlarophenal	200 ug/mL
							2,4-Dimethylphenol	200 ug/mb
							2,4-Dinitrophenol	400 ug/mL
							2,4-Dinitrotoluene	200 ng/mL
							2,6-Dichlorophenol.	200 Mg/mL
							2, 6-Dinitrofoluene	200 ug/mL
							2-Chloronaphthalene	200 ng/mL
							2-Chlorophenol	200 ug/mL
							z-metnyinaphthalene	ZOU NG/ML
							2-Methylphenol	200 ug/mL
							2-Nitroaniline	200 ng/mt
							2-Nitrophenol	200 ug/mL
							3-Nitroaniline	200 ug/mL
							4,6-Dinitro-2-methylphenol	400 ug/mL
							4-Bromophenyl phenyl ether	200 ng/mL
							4-Chloco-3-methylphenol	200 ng/mL
							4-Chloroaniline	200 ug/mL
							4-Chlorophenyl phenyl ether	200 ug/mL
							4-Methylphenol	200 ng/mL
							4-Nitroaniline	200 ug/mL
							4-Nitrophenol	400 ng/mL
							Acenaphthene	200 ng/mL
							Acenaphthylene	200 ug/mL
							Acetophenone	200 ng/mL
							Antline	200 ng/ml.

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

	Concentration	200 ug/mL	TW/20 000		200 ug/mL		200 Mg/mL		200 ug/mL	200 ug/mL	250 ug/mL	200 ug/mt	200 ug/mL	200 ug/mL	200 ag/mL	200 ug/mL	200 ug/mt	200 ug/mL	200 ug/mL	342 ng/mt	200 ug/mL	200 ng/mt	200 Mg/mL	200 ug/mL	200 ug/mL	200 ng/mL	200 ng/mL	200 ag/mL	200 ug/mL	200 ng/mF	400 ug/mL	Julyan DOS	200 ug/mL	400 ug/mL	200 ug/mL	200 ng/mL	200 wg/mL	200 ug/mL	200 ng/mL	250 ug/mL	TW/5% 002	200 ug/mL
	Analyte	Anthracene	Hando of anthracens	Benevial audumateur	Benzolbifluoranthene	Bangolo, h. Libarylana	Benzofk-Fluoranthene	Benzyl alcohol	Bis (2-chloroethown) methane	Bis(2-chloroethyl)ether	Bis(2-ethylhexyl) phthalate	Buryl benzyl phrhalate	Carbazole	Chrysene	Ni-n-octv phthalate	Dibenz(a, h) anthracene	Dibenzofuran	Distby! phthalate	Dimethyl phthalate	Diphenylamine	Fluoranthene	Floorene	Mexachlorobenzene	Hegachlorocvelopentadiene	Hexachlorosthane	Hexadecane	Indeno[1, 2, 3-cd]pyrene	Tauphorone n-Decane	N-Nitrosodi-n-propylamine	N-Nitrosodimethylamine	N-Nitrosodiphenylamine	Manhillane	Nitrobenzene	Pentachlorophenol	Phenanthrene	Phenol	Pyrene	Pyridine		-	Benzaldehyde	Caprolactam
p)	Volume																																					1000	7000 00	1000 nL		
Patent Reagent	Reagent ID																																					TISTS SING SOODS	POPPER STE OFFICE	MB LISIT STK DOOD2		
Toolean	Final																																					2	5	M		
	Dilutant																																									
	Prep Dilutant Date Used																																									

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Job No.: 480-89467-1

				Hearing	and state and and			
Н	EMp	Prep	Dilutant Used	Final	Reagent ID	Volume Added	Analyte	Concentration
							Benzidine	200 ag/mt
<u> </u>	Ī				MR SURR STX DD042	400 uL	-	200 ud/mL
								200 na/ml.
							0-Fluorenthems1	200 waymi
							Minneybardanana Agustu	200 un/ml.
							with confidence and a format	350 wa/mi
1	Ī						There is	74/45 005
Ī	21/25/51		100 100 101 Act of		(Thenchased Resent)	int.	Talinband	TO/50 002
THE PERSON NAMED AND ADDRESS OF THE	WT) TO		PERSONAL DOLL BULLIANS		Special Property and	1-11	The principal	TOOK MEN INTE
							1,2,4,5-retrachiocoenzene	TOTAL DEST
							1,2,4-Truchloropenzene	TOOO DOVER
							1,2-Dichlorobenzene	1000 ng/mp
							1,2-Diphenylhydratine	1000 ug/mL
							1.3-Dichlorobenzene	1000 ug/mL
							1.3-Dimitrobanzana	1000 nev/mf.
							1 A-Ti-Alexandre	Tm/200 000t
							The promotor of the state	milda occi
							1,4-Dioxane	TOOO ED/ME
							1-Methyinaphthalene	1000 ug/mL
							9 9 *- Acuth of 1-chlored remand	\$000 weeker
							crs -oxypisir-culocopropane;	1000 tg/mt
							2,3,4,6-Tetrachlorophenol	1000 nd/mr
							2, 4, 5-Truchlorophenol	1000 uq/mL
							O A S-Trickloromband	1000 Novet
							and a contraction of the contraction	Tay on a court
							7,4-Ulentorophenol	TOOO nd/mr
							2,4-Dimethylphenol	1000 ng/mt
							2.4-Dinitrophenol	2000 MG/ML
							3 A-Dinitratelhana	1000 notal
							2, 4 Tamatamane	1000 mg/mm
							2,6-Dichiorophenol	1000 ng/mr
							2,6-Dinitrotoluene	1000 ug/mL
							2-Chloronarhthalene	1550 na/ml
							0-ChlorophenoT	1000 ua/ml.
							A Mathematical state by a land	Test of the
							- We'nny maphiniatene	TOO GO WIT
							2-Methylphenol	1000 ng/mb
							2-Witnoaniline	1000 ug/mL
							2-Nitrophenol	1000 ng/mL
							3-Natroanaline	IGOU ug/mL
							4.6-Dinibro-9-mathylphanol	2000 ng/mt
							d-Recombined shared schar	1000 no/ml.
							A.Oblaca Jamosharlahanal	Import Cool
							Acres of mental transmit	10000 00000
							1 chargantene	TWIN DOOR
							4-Culotophenyl phenyl ether	TOOO REVENT
							4-Methylphenol	1000 ng/mr
							4-Nitrogriline	TW/5% 0001
							4-Nitrophenol	2000 uc/mL
							Acenaphthene	1000 ug/mf.
							Acenarhthylene	1000 na/ml.
							Doetonherone	TARRA mar/ml.
							35.5 Contraction 25.5 C	1000 1000
							auritua	THE PROPERTY OF THE PARTY OF TH
							Anthracene	1000 ug/m
							Azobenzene	TUTO WELLE

REAGENT TRACEABILITY SUMMARY

Job No.: 480-89467-1 Lab Name: TestAmerica Buffalo

			1 2 2 2 2 2 2	Patent Readent	7.7		
Reagent ID	Swp	Prep Date	Dilutant Final	Reagent ID	Volume Added	Analyte	Concentration
						Benso[a]authracene	1000 ug/mL
						Benzo alpyrene	1000 ug/mL
						Benzo[b]fluoranthene	1000 nd/mr
						Benzolg,h,ilperylene	1000 ng/mr
						Benzo[k]fluoranthene	1000 ng/mL
						Benzyl alcohol	1000 ng/mL
						Bis (2-chloroethoxy) methans	1000 Mg/mL
						Bis(2-chloroethyl)ether	1000 ug/mL
						Bis(2-ethylhexyl) phthalate	1000 ng/mL
						Buryl benzyl phthalate	1000 ug/mL
						Carbazole	1880 ug/mL
						Chrysene	1000 ug/mt
						Di-n-butyl phthalate	1000 ug/mL
						Di-n-octyl phthalate	1000 ng/mL
						Dibenz(a,h)anthracene	1000 ng/mr
						Dibenzofuran	1000 ng/mF
						Distryl phthalate	1000 ug/mL
						Dimethyl phthalate	3000 ug/mL
						Diphenylamine	1710 ug/mL
						Fluoranthene	1000 ug/mL
						Fluorene	1000 ug/mL
						Hexachlorobenzene	1000 ug/mL
						Hexachlorobutadiene	
						Hexachlorocyclopentadiene	1000 Mg/mL
						Hexachlorocthane	
						Hegadecane	1000 ug/mL
						Indeno[1, 2, 3-od]pyrene	1000 ug/mL
						Isophorone	1000 ng/mF
						n-Dedane	1000 ug/mL
						N-Nitrosodi-n-propylamine	1000 ug/mF
						N-Nitrosodinethylamine	1000 ng/mL
						N-Nitrosodiphenylamine	2000 ug/mL
						n-Octadecane	1000 ng/mF
						Naphthalene	1000 ug/mL
						Nicrohensene	
						Pentachlorophenol	2000 ug/mL
						Phenanthrene	1000 ug/mL
						Phenol	1000 ug/mL
						Pyrene	1000 ug/mL
			1			Pyridine	1000 ng/mL
ME LISTO STK 00002	08/31/18	Restex	ak, Lot Adioasas	(Surghased Reagent)	nt)	Benzolc acid	2000 ng/mL
COCCO SHALL AND COCCO	217,188,30	Children Children	DOUBLE AND TOP OF	Transcript Contraction (1	7070010	TOOO notwo
Thomas and there are	DT /== / 00	20226	SA, Dou husuback	pheny magemana)	171	Horral Jahria	2000 ng/mt.
						Cantolactan	2800 ng/ml.
MB LIS9 STR 00502	01/31/16	Seste	Rester, Lot ACTICESI	(Enrchased Readent)	nti	3.3Dichlorobenzidine	2000 ud/mt.
			A CONTRACTOR OF THE PARTY OF TH			Benzidine	2000 ug/mL
MB SUPR STS 00042	01/12/18	Rest	Restel, Lot A092712	(Burchased Reagent)	nt)	2,4,6-Tribromophenol	50.00 ng/mL

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REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 48D-89467-1

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				4 10 10 10 10	Patent Reagent	nt		
Reagent ID	EMp	Prep	Dilutant	Final	Reagent ID	Volume	Analyte	Concentration
							2-Fluorobuphenyl	5000 uq/mL
							2-Simorophenol	5000 ng/mE
							Nitrobenzene-d5 (Surr)	5000 uq/mL
							D-TerohenvI-dI4 (Surr)	5000 ug/mL
								5000 ug/mL
MB LISTI WRK 00219	21/38/10	1130/23/15	-		T on I MR LASET TWY DODGE	30 00s	1.2 '-Rinhenvi	100 ng/ml.
		1000000	121470				-freeder -1-	G
							1,2,4,5-Tetrachlorobenzene	100 ng/mL
							1, 2, 4-Trichlorobenzene	100 mg/mf
							1,2-Dichlorobensene	100 ug/mL
							1, 2-Diphenylhydrazine	100 ng/mL
							1, 3-Dichlorobensene	100 ug/mL
							1,3-Dinitrobengene	100 ug/mL
							1,4-Dichlorobenzene	100 ng/mF
							1,4-Dioxane	100 ng/mL
							1-Methylnaphthalene	100 ng/mL
							2,2'-oxybis[1-chloropropane]	100 ug/mL
							2,3,4,6-Tetrachlorophenol	100 Mg/mL
							2, 4, 5-Trichlorophenol	100 uq/mL
							2,4,6-Trichlorophenol	130 uc/mL
							2,4-Dichlotophenol.	100 ng/mL
							2.4-Dimethylphenol	100 ng/mL
							2.4-Dimigrophenol	200 ng/mL
							2.4-Dinitrotoluene	100 ng/mL
							O Kalling or prophenol	Tale and Tale
							Totalianian and a C	100 maying
							2,0-Unitionorumene	TOO MEN UNT
							2-Chloronaphthalene	Tog ng/mr
							2-Chlorophenol	100 ng/mL
							2-Wethyinaphthalene	100 ng/mr
							Z-Weth/Threnot	TOO NG/WE
							2-Nithodniline	TOO US/UP
							2-Nitrophenoi	TOG EG/ME
							3-Nithogniline	TOO REVINE
							4,6-Dinitro-2-methylphenol	200 ug/mL
							4-Bromophenyl phenyl ether	100 ug/mt.
							4-chloro-3-methylphenol	100 ug/mL
							4-Chloroaniline	Too nd/mr
							4-Culorophenyl phenyl stner	TOO MEYER
							4-Methylphenol	100 ug/mL
							4-Nitroaniline	100 ng/mL
							4-Nitrophenol	200 ug/mL
							Acenaphthene	100 ng/mL
							Acenaphthylene	100 ag/mL
							Acetophenone	100 ng/mL
							Aniline	100 ng/mL
							Anchracene	100 ug/mL
							Azobenzene	100 ng/mL
							Benzo[a]anthracene	100 mg/mF
				Page 134 of 326	F 306			41/13/2015
				200	240 5			>

REAGENT TRACEABILITY SUMMARY

Jap No.: 480-89467-1 Lab Name: TestAmerica Buffalo

11/13/2015

Lab Name: TestAmerica Buffalo Jop No.: 48D-89467-1

				Readent	Parent Reagent	nic.		
Reagent ID	EMp	Prep	Dilutant	Final	Reagent ID	Volume Added	Analyte	Concentration
							1. 1	100 ug/mt
								100 ng/mp
							p-Terphenyl-dl4 (Surr)	100 ug/mL
		2 4 1 2 2 2 2 2	_	1				Tell agymp
MB List: INT 00022	07/31/16	10/08/12	Methylene Chloride, Lor 121470	IO mt N	TO ME LIST STK 00023	2000 at	1,1'-Biphenyl	200 ug/mL
			2				1,2,4,5-Tetrachlorobenzene	200 ug/mL
							1,2,4-Trichlorobenzene	
							I.2-Dichlorobenzene	
							1.2-Diohenvihydrazine	
							1.3-Dichlorobenzene	200 kg/mL
							1.3-Dinitrobenzene	200 ug/mL
							1,4-Dichlorobenzene	200 ug/mL
							I,4-Dioxane	200 ug/mL
							1-Methylnaphthalene	200 ag/mL
							2.2'-cyybis[1-chloropropane]	200 ug/mL
							2,3,4,6-Tetrachlorophenol	200 ug/mL
							2,4,5-Trichlorophenol	200 ug/mL
							2,4,6-Trichlorophenol	200 ug/mL
							2,4-Dichlorophenol	200 ug/mL
							2,4-Dimethylphenol	200 ug/mL
							2,4-Dimitrophenol	400 ng/mL
							2,4-Dimittotoluene	200 Ag/mL
							2, 6-Dichlorophenol	200 ug/mL
							2,6-Dinitrotoluene	200 ug/mt.
							2-chloronaphthalene	200 ug/mL
							2-Chlorophenol	200 ng/mL
							2-Wethylnaphthalene	200 Mg/mL
							2-Methylphenol	200 ng/mL
							2-Nitroaniline	200 ug/mL
							2-Nitrophenol	200 ug/mL
							3-Nitroaniline	200 ug/mL
							4,6-Dinitro-2-methylphenol	400 ug/mL
							4-Bromophenyl phenyl ether	200 ug/mt
							4-Chloro-3-methylphenol	200 ug/mL
							4-Chloroaniline	200 ug/mL
							4-Chlurophenyl phenyl ether	200 ug/mL
							4-Methylphenol	200 ug/mL
							4-Nitrosmiline	200 ng/mL
							4-Nitrophenol	4.00 ug/mL
							Acenaphthene	200 ug/mL
							Acenaphthylene	200 ng/mL
							Acetophenone	200 ug/mL
							Aniline	200 ag/mL
							Anthracene	
							Azobenzene	200 ug/mL
							Benzo[a]anthracene	200 ug/mL
							Behaof alloviene	200 ug/mL

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REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

Property Control Property Co					100000	Parent Reagent	120		
Benzo(fi) Ellocanthene	Reagent ID	Swp Date	Prep	Dilutant	Final	Reagent ID	Volume Added	Analyte	Concentration
Benzo[g_h,l]pertylene								Benzo[h] Eluoranthene	200 ug/mt
Benzo[k][I] Benzo[k][I] Benzo[k][I] Benzo[k][I] Bis[2-ch]] Collol. Collol								Benzolg, h, ilpervlene	200 ng/mb
Bensyl alcohol Bis [2-ch] stockhowy)methane 200 Bis [2-ch] stockhowy)methane 200 Bis [2-ch] stockhowy)methane 200 Buryl bensyl phthalate 200 Buryl bensyl phthalate 200 Carbesole 200 Directoly phthalate 200 Bisachlorochemen 200 Hexachlorochemen 200 Naitrosodimethylamine 200 Naitrosodimethylamine 200 Naitrosodimethylamine 200 Preme 200 P								Benzofk1fluoranthene	200 ug/mL
Bis[2-chloroethoxy]methane								Benzyl alcohol	200 ng/mL
Big[2-ch]Orcethyllether								Bis(2-chloroethoxy)methane	200 ug/mL
Bis[2-ethylhesyl] Dathalate 200 Carbazole 200 Carbazole 200 Carbazole 200 Carbazole 200 Carbazole 200 Carbazole 200 Di-m-butyl Dathalate 200 Dibenz(a,h) anthracene 200 Eluocanthene 200 Hexachlorobusdatene 200 Hexachlorobusdatene 200 Hexachlorocyclopentadiene 200 Hexachlorocyclopentadiene 200 Hexachlorocyclopentadiene 200 Hexachlorocyclopentadiene 200 Hexachlorochene 200 Maxitroscodinethylamine 200 Maxitroscodinethylamine 200 Maxitroscodinethylamine 200 Maxitroscodinethylamine 200 Parene 20								Bis(2-chlosoethyl) ether	200 ng/mt.
Butyl benzyl phthalate								Bis(2-ethylhexyl) phthalate	200 wg/mL
Carbazole Carbazole Carbazole Carbazole Carbazole Carbazole Carbazole Carbazole Carbazole Carbazole Carbaryeme 200 Dierolyl phthalate 200 Dierolyl phthalate 200 Dierolyl phthalate 200 Dierolyl phthalate 200 Dierolylamine 200 Eluorenthere 200 Hexachlorobenzene 200 Hexachlorobenzene 200 Hexachlorocyclopentadisne 200 Hexachlorocyclopentadisne 200 Hexachlorocyclopentadisne 200 Hexachlorocyclopentadisne 200 Hexachlorocyclopentadisne 200 Hexachlorocyclopentadisne 200 N-Nitrosodinethylamine 200 N-Nitrosodinethylamine 200 N-Nitrosodinethylamine 200 N-Nitrosodinethylamine 200 N-Nitrosodinethylamine 200 N-Nitrosodinethylamine 200 Phenol 200 Enzaline 200 2.3 **Dichlorobenzidine 200 2.4 **S**Dichlorobenzidine 200 2.4 **S**Dichlorobenzidine 200 2.4 **S**Dichlorobenzidine 200 2.5 **Dichlorobenzidine 2.00 2.00 2.5 **Dichlorobenzidine 2.00 2.00 2.5 **Dichlorobenzidine 2.00 2								Buryl benzyl phthalate	200 ug/mL
Chrysene Chrysene 200								Carbazole	200 ug/mt
Di-n-buty1 phthalate								Chrysene	200 uq/mL
Dierrocysty phthalate								Di-n-butyl phthalate	250 ng/mL
Dibenzide, highthacene								Di-n-octyl phthalate	200 ug/mt
District Chicago District Chicago District Chicago District Chicago District Chicago District Chicago Eluocanthene 342 Eluocanthene 342 Eluocanthene 342 Eluocanthene 340 Hexachlorobradiane 200 Hexachlorobradiane 200 Hexachlorobradiane 200 Hexachlorobradiane 200 Hexachlorobradiane 200 Hexachlorobradiane 200 Naitcosodimethylamine 200 Pirene 200 P								Dibenz (a, h) anthracene	200 ug/mL
Disciple Phihalate 200 Disciple Phihalate 200 Disciple Phihalate 200 Disciple Phihalate 200 Ellocanthere 200 Ellocanthere 200 Hexachlorobencene 200 Hexachlorobencene 200 Hexachlorocyclopentadisne 200 Hexachlorocyclopentadisne 200 Hexachlorocyclopentadisne 200 Hexachlorocyclopentadisne 200 Indemofile 3-acdipyrene 200 N-Nitroscolinetbylamine 200 Phenol Phenol 200 Phenol 200 Phenol 200 Phenol 200 Phenol 200 Phenol 200 Encatine 200 200 Encatine 200 Encatine 200 Encatine 200 Encati								Dibenzofuran	200 ng/mL
Dimethyl pithalate 200								Diechyl phthalare	200 ug/mL
DiplemyLamine								Dimethyl phthalate	200 ug/mL
Flooranthene 200								Diphenylamine	342 ug/mL
Ellocome Hexachlorobenzene Hexachlorobunadiene Hexachlorocyclopentadiene Hexachlorocyclopentadiene Hexachlorochane Hexachlorochane Hexachlorochane Hexachlorochane Trodeno[1,5,3-cd]pyrene Indeno[1,5,3-cd]pyrene Indeno[1,5,3-cd]pyr								Fluocanthene	200 ug/mL
Hexachlorobarane Hexachlorobarane Hexachlorobaradiene Hexachlorocyclopentadiene Hexachlorocyclopentadiene Hexachlorocyclopentadiene Hexachlorocyclopentadiene Hexachlorocyclopentadiene Isophorone N-Nitrosodinerpylamine pylaminerpylaminerpylaminerpylaminerpylaminerpylaminerpylaminerpylaminerpylaminerpylaminerpylaminerpylaminerpylaminerpylaminerpylaminerpylaminerpylam								Fluorene	200 ug/mL
Hexachloroby radiene Hexachloroby radiene Hexachlorocyclopentadiene Hexachlorocyclopentadiene Hexachlorocyclopentadiene Hexachlorocyclopentadiene Hexachlorocyclopentadiene Isophorone N-Nitrosodinetbylamine Phenzithene Pyridine Pyridine N-Nitrosodine N-Nitrosodine N-Nitrosodinetbylamine N-Nitrosodine N-Ni								Hexachlorobenzene	200 ug/mL
Hexachlorocyclopentadiene Hexachlorocyclopentadiene Hexachlorocthane Indexoli, 2,3-cdlpylamine Indexoli, 2,3-cdlpylamine Indexoline In-propylamine Indexoline INCO of Printers INCO of Printers INCO of Printers INCO of Indexol Indexo								Hexachlorobutadiene	200 ig/mL
Hexachlorocthane Hexachlorocthane Indexol_L_G, 3-cd]pyrene Isophorone Indexol_L_G, 3-cd]pyrene Indexol_L_G, 3-cd]pyrene N-Nitroscdinethylanine N-Nitroscdinethylanine N-Nitroscdinethylanine N-Nitroscdinethylanine N-Nitroscdinethylanine N-Ortadecane Naphthalene Naphthalene Naphthalene Phenal Phena								Hexachlorocyclopentadiene	200 ug/mL
Hexade Cattle Indexo(i, 2, 3-cd)pyrene Isophotone Indexo(i, 2, 3-cd)pyrene Indexo(i, 2, 3-cd)pyrene Indexod in -propylamine N-Nitroscodinethylamine N-Nitroscodinethylamine N-Nitroscodinethylamine N-Nitroscodinethylamine N-Nitroscodinethylamine N-Nitroscodinethylamine N-Nitroscodinethylamine N-Nitroscodinethylamine Phenolitene Phenolitene Phenolitene Pyridine Indexe							Hexachloroethane	200 ng/mt	
Indeno[1, 2, 3-cd]pytene Isophorone In-Decame N-Nitrosodin-n-propylamine N-Nitrosodinethylamine N-Nitrosodinethylamine N-Nitrosodinethylamine N-Nitrosodinethylamine N-Nitrosodinethylamine N-Nitrosodinethylamine N-Nitrosodinethylamine N-Nitrosodinethylamine N-Nitrosodinethylamine Pentachiorophenol Phenarthrene Phenarthrene Phenarthrene Pytidine Pytidine Pytidine N-Nitrosodinethylamine Pytidine Pytidine Pytidine N-Nitrosodinethylamine Pytidine Pytidine Pytidine Pytidine Pytidine Pytidine Pytidine Potodinethylamine Pytidinethylamine Pytidinethylamine								Hexadecane	200 Mg/mL
Isophorone N-Nitroscdi-n-propylamine N-Nitroscdimethylamine N-Nitroscdimethylamine N-Nitroscdimethylamine N-Nitroscdimethylamine N-Ortadecane Naphhalene Naphhalene Naphhalene Phenarthrene							Indeno[1, 2, 3-ad]pyrene	200 ug/mL	
n-Decame N-Nitroscoll-n-propylamine N-Nitroscoll-n-propylamine N-Nitroscoll-n-propylamine N-Nitroscoll-n-propylamine N-Nitroscoll-n-propylamine N-Nitroscoll-n-propylamine N-Nitroscoll-n-propylamine Naphbalene Naphbalene Phenothene Phenothene Phenothene Phenothene Phenothene Pyridine N-Nitroscoll-n-propylamine N-Nitroscoll-n-propylamine N-Nitroscoll-n-propylamine N-Nitroscoll-n-propylamine N-Nitroscoll-n-propylamine N-Nitroscoll-n-propylamine Periodine Periodine Periodine N-Nitroscoll-n-propylamine Periodine N-Nitroscoll-n-propylamine N-Nitroscoll-n-propyl								Isophorone	200 ug/mt
N-Nittoscodinethylamine N-Nittoscodinethylamine N-Nittoscodinethylamine N-Nittoscodinethylamine N-Octadecane Naphbalene Nittobersene Pentachlorophenol Phenol Phenol Phenol Phenol Phenol Attathene 1000 ul Attathe Enzalne 2.4.6-Wilheryl								n-Decame	200 ug/mL
N-Nittosodimethylamine N-Nittosodiphenylamine In-Ottadecane Naphbalene Naphbalene Nittobanane Phenambhene								N-Nitrosodi-n-propylamine	290 ng/mL
N-Nitrosodiphenylamine In-Octadorane Naphtbalene Naphtbalene Rentachlorophenol Phenol								N-Nitrosodimethylamine	200 ug/mt
Naghtbalene Naghtbalene Nightbalene Nightbalene Nicobensene Fentachlorophenol Fhenol Pyrene Pyridine Pyridine Tydou ut Person acid Trdene Indo ut Ateath Enrathe Enrat								N-Nitrosodiphenylamine	400 ug/mL
Naphthalene Naphthalene Pertachlorophenol Phenanthene Phenanthene Phenanthene Phenanthene Pyrene Pyridine Postdine Pertablene								n-Octadecane	200 ug/mL
Mitcobessese Rentachlorophenol Phenasthene Phenol Phenol Pytelne Pyteldne Pyteldne Pyteldne Pyteldne Pyteldne Ported de hyde Benzeldehyde Cagrolattam 1000 ul Atratine Denzeldehyde Denzeldine Perzeldine Ported dine Perzeldine							Naphthalene	200 ug/mL	
Pencachlorophenol Phenarthene Phenol Phenol Pyrene Pyridine 1000 ut Atraitne Denzaldehyde Captolactan 1000 ut 3.3°-Dichlorobenzidine Prizitne Prizitne Porolectan Porolectan 2.3°-Citchlorobenzidine 2.4°-Titherephenol 2.5[10000]								Mittobensene	200 ng/mL
Phenarthtene Phenol Pytene Pytene Pytidine Pytidine 1000 ul Benzaine Enzaine Enzaine Caprolactam 1000 ul 3.3"-Dichlorobenzidine Perzaine Portolactam 1000 ul 2.4"-G"-Titchroropenol 2.4"-G"-Titchroropenol 2.4"-G"-Titchroropenol								Pentachlorophenol	400 ug/mL
Phenol Pyridine 1000 ul Paridine 1000 ul Ricaine Enzidelkive Enzidelkive Enzidelkive 1000 ul 3.3 "Dichlorobenzidine Peridine Peridine 2 Ellorobiphenyl								Phenanthrene	200 ug/mL
Pyrene Pyrene Pyridine Denzidine Denzidehyde								Phenol	Tm/fin DQ2
1000 ul Benzera acid. Todena 1000 ul Atrasine Enzaldeliyde Captolactam 1000 ul 3.3"-Dichlorobenzidine Perzeline Perzeline 2.4,6-Wilheryl								Pyrene	200 ug/mL
1000 ul Benzota doid 1000 ul Atrasine Benzaldehyde 2.82 roichtobenzidine Benzaldine Benzaldine Penzaldine 2.810000klphanyl								Pyridine	200 ug/mL
1000 ul Atrazine Benzaldehyde Caprolactam 1000 ul 3.3°-Dichlorobenzidhe Benzaldehyde 400 ul 2.4°-Tilbromophenol 2-Eluorokuphenyl						MB LISIC STK DODO2	1000 at		200 ug/mL
2 1000 uL Attaine pensaldehyde 1000 uL 3.3~Dichlorobenzidine Penzaldehyde 400 uL 2.4.6~Tibenephenol 2.8.1000blabenyl									200 ng/mL
Deprolactem 1000 uL 3.3"-Drchlorobenzidine Benzalane 400 uL 2.4"-Tilbromohenol 2-Eluorokuphenyl						MB LISII STK 00002	1000 nF		Z00 wg/mr
1000 up 3.3 -nrchlorobenzidine Benzidine 400 ut 2.4 - Tribromophenol 2-Eluorokuphenyl								Benzaldehyde	200 ug/mL
1000 ul 3.3 "-Dichlorobenzidhe Ferzidher 400 ul 5.4 "Tibencephenol 2-Eluorobiphenyl								_	200 ng/mt
400 ut 2,4,6-Wribromophenol 2-%iuotobiphenyl						MB L189 STK 00002	1000 ml	_	200 ng/mL
400 ut 2,4,6-Tribromophenel 2-Fluorobiphenyl								Benzidine	250 ug/mL
						MB SURR STK 00042	400 ut	2, 4, 6-Tribromophenol	TH/5M 002
								2-Fluorobiphenyl	200 ug/mI

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Lab Name: TestAmerica Buffalo Jop No.: 48D-89467-1

			tueste	the	Parent Reagent		
Reagent ID	EMP	Prep	Dilutant Final	ial ine	Reagent ID Added	Analyte	Concentration
						Nitrobensere-d5 (Surr)	200 ug/mL
				_		p-Terphenyl-dl4 (Surr)	200 ng/mE
				1		Phenol-d5	200 ug/mL
MB LISI STK 00023	31/1E/TI		Restek, Lot A0111934		(Sunchased Reagent)	1,1'-Biphenyl	1000 ug/mL
				_		1,2,4,5-Tetrachlorobenzene	1000 ug/mL
						1,2,4-Trichlorobenzene	1000 ng/mL
						1,2-Dichlorobensane	1000 Mg/mL
						1,2-Diphenylhydrazine	1000 ug/mL
						I, 3-Dichlorobensene	1000 ug/mL
						1,3-Dinitrobensene	1000 ug/mL
						1,4-Dichlorobenzene	Indo ng/mL
						1,4-Diogane	1000 ug/mt
						1-Methylnaphthalene	1000 ng/mL
						2,2'-oxybis[I-chloropropane]	1000 ng/mL
						2, 3, 4, 6-Tetrachlorophenol	1000 ng/mL
						2, 4, 5-Trichlorophenol	1000 ng/mL
						2, 4, 6-Tri-chlozophenol	1000 ug/mL
						2.4-Dichlocophenol	3000 ng/mL
						2,4-Dimethylphenol	1000 ud/mL
						2,4-Dinitrophenol	2000 uq/mL
						2.4-Dinitrotoluene	1000 ng/mL
						2.6-Dichlorophenol	1000 ug/mL
						2.6-Dinitrotoluene	1000 ng/mt
						2-Chloronarhthalese	TODO MAYINE.
						2-Chlorophenol	1000 uc/mL
						2-Methylnaphthalene	1000 ug/mE
						2-Methylphenol	1000 ug/mL
						2-Nitroaniline	1500 ng/mL
						2-Nitrophenol	1000 ng/mL
						3-Nitroaniline	1000 ug/mL
						4,6-Dinitro-2-methylphenol	2000 ng/mL
						4-Bromuphenyl phenyl ether	1000 ug/mL
						4-Chloro-3-methylphenol	1000 ng/mL
						4-Chloroaniline	1900 ug/mE
						4-Chlorophenyl phenyl ether	1000 ng/mL
						4-Methylphenol	1000 ng/mF
						4-Nitroaniline	Tm/bn 0601
						4-Mitrophenol	2000 ug/mL
						Acenaphthene	1000 ug/mL
						Acenaphthylene	1000 ng/mL
						Acetophenone	1000 ng/mr
						Aniline	1000 nd/mr
						Anthracene	1000 ug/mL
						Azobendene	1000 ug/mL
						Benzo[a]anthracene	1800 ug/ml
						Benzo[a]pyrene	1000 ug/mt
						Benzo[B]fluoranthene	1000 ug/mL
						Benzo[d, h, i]perylene	1000 ng/mr

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REAGENT TRACEABILITY SUMMARY

Jap No.: 48D-89467-1 Lab Name: TestAmerica Buffalo

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N. CA	2		
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Seapern: ID Date Distant Final Respect ID Wolfase Analyte Concentration Conc	ENGY Proper Direct Violings Violings Added Statist Direct	Exp Prep Dilutant Final Medium Pate Date Date Deed Volume	Wolume Added	0 b	Concentration 1000 ug/mL
Bring of Elitocatifiens 1000	Bring of Elizabethes		Bensyle Bis (27-18-18-18-18-18-18-18-18-18-18-18-18-18-	[K]filworanthene [L] alcohol [L] alcohol [L] alcohol [L] orcethyllether [L] orcethyllethe	1,000 ug/mL 1,000
Starty = 0.00	Bringly and Colored Bringly and Colored		Bensyl Bis(2- Bis(2- Bis(2- Chryses) Chryses Chryses Diber	i alechci chicochiosyjmethane chicocheckyjjether ethylhesyljphthalate bensyl phthalate bensyl phthalate bensyl phthalate botyl phthalate octyl phthalate octyl phthalate octyl phthalate oftyl phthalate oftyl phthalate oftyl phthalate oftyl phthalate oftyl phthalate olyl camine ann hicocheckensens hicocheckensens hicocheckensens octobertane	1000 ug/mL 1000 ug/mL
1912 2.010	1912 2.0		Bis 12- Bis 12- Bis 12- Chress Chress Chress Dibers Dibers Dibers Dibers Dibers Hexach Hexach Hexach Hexach Hexach Hexach Hexach Hexach Hexach Hexach	chloroethoxy) me thane -chloroethoxy) me thane -chloroethyl ether -ethylhexyl) phthalate sole benzyl phthalate sole socyl phthalate socyl phthalate socyl phthalate yl phthalate yl phthalate and than the sole in the sole anthene an	1000 ug/mL 1000 ug/mL
1412 - 4179/140821 1414 -	1812 1812 1818		Pis 22- Bury L Bury L Catbar Chibar Chibar Di-n-o D	-chlorocthylether -chlorocthylether -chlylhesyl phthalate -che -chylhesyl phthalate -che -che -che -che -che -che -che -ch	1000 Ng/mb 1000 Ng/mb
10 10 10 10 10 10 10 10	Statis S		Bis 22- Cutya Cutya Cutya Cutya Din-n-u Din-n-u Dinent Dineth Mexach Hexach	ethylhesyl phthalate bensyl phthalate cole sole butyl phthalate butyl phthalate cotyl phthalate f(4, h) anthracene cofyl phthalate yl phthalate yl phthalate yl phthalate anthese mine mine liotoknosus hloroknosus hloroknosus	1000 ug/mL 1000 ug/mL
Selection Cathadole Cathadole 1000	Selection Catherine 1000		Estabase Ohrwes Disconding the condition of the conditi	beneyi phthalate 20le 20le butyl phthalate butyl phthalate octyl phthalate 20furan yl phthalate yl phthalate yl phthalate yl phthalate hyl phthalate hyl phthalate hyl phthalate hyl phthalate hyl phthalate hyl phthalate anthene a	1000 tq/mL 1000 tq/mL
Cherksone Cherksone 1000	Carladol Carladol Carladol 1000		Cathas Chrys Din-r- Din	orole sone butyl phthalate cotyl phthalate cotyl phthalate g (4,h) anthracene g (4,h) anthracene yl phthalate yl phthalate anthene anthene llorobensene hlorobunadiene hlorovinadiene sodne	1000 Mg/mL 1000 Mg/mL
Discrete Discrete 1000	100 100		Ohrves Dibens Dibens Dibens Dibens Dimeth Di	Dina Dina Dina (a, h) anthracene (a, h) anthracene (a, h) anthracene (a, h) anthracene (b) bithalate VI phthalate VI phthalate All phthalate anthracene anthracene All coloratione Liotobenegie	1000 ug/mL 1000 ug/mL
Distriction Distriction	District No. 2016 Dist		10 - 1 - 10 - 10 - 10 - 10 - 10 - 10 -	outyl phthalate octyl phthalate (4, hlantracene sofuran yl phthalate yl phthalate yl phthalate nuthene and hlorobensene hlorobensene hlorobensene hlorobethane	1000 ug/mc 1000 ug/mc
Different of the late of the	District A limit Lacener 2000 District Lacener 2000 District A limit Lacener 2000 District Lacener 2000		Dipens Di	es (a, h) anthracene soft, and anthracene soft, and ly phthalate ly phthalate anthene anthene anthene locobensene hlocobensene hlocobradiene llocobensene softe	1000 ug/mL 1000 ug/mL
Differential plantial cargonia	Differential Application		Diberson Dimeth	s(a, h) anthracene cofuran l phthalate hyl phthalate nathene ne nlorobensene hlorobensene hlorobensene hlorobyclopentadiene nlorosyclopentadiene et ordene	1000 ug/mL 1000 ug/mL
District District	District District Exp. District Control of E		Total of the control	opfutan yl phthalate yl phthalate bylamine anthene ne nickopensene nickopensene nickopensene nickopensene nickopensene nickopensene nickopensene nickopensene nickopensene	1000 ug/mL 1000 ug/mL 1000 ug/mL 1710 ug/mL 1000 ug/mL 1000 ug/mL 1000 ug/mL 1000 ug/mL 1000 ug/mL 1000 ug/mL
Dimethyl phthalate	Dimethyl phthalate		Dipetry Dipetry Diphetry Ellora Fluora Hexach Hexach Hexach Hexach Hexach Hexach Hexach Hexach Hexach Hexach Hexach Hexach Hexach Hexach	yl phthalate hyl phthalate noviamine anthene anthene anthone hiorobeneene hiorobyclopentadiene acene	1000 ug/mL 1000 ug/mL 1000 ug/mL 1000 ug/mL 1000 ug/mL 1000 ug/mL 1000 ug/mL 1000 ug/mL 1000 ug/mL 1000 ug/mL
Displayidanto	DishbaryLanine		Alampia Brandr	y) phthalate y) amine anthese anthese no horoxenceme hloroxencediene hloroxyclopentadiene ecene	1000 ug/mL 1000 ug/mL 1000 ug/mL 1000 ug/mL 1000 ug/mL 1000 ug/mL 1000 ug/mL 1000 ug/mL 1000 ug/mL
Publishing Pub	Pinchamber Pin		A House of the control of the contro	oylamine anthene nicrobensene hicrobensene hicroberselene hicrobenselene hicroberselene	1710 ug/mL 1000 ug/mL 1000 ug/mL 1000 ug/mL 1000 ug/mL 1000 ug/mL 1000 ug/mL 1000 ug/mL
Elucezne Elucezne 2000 Hexachloc/cebresens 2000 Hexachloc/cebr	Since and the season Place and the season		ETUTOR BANADA HEXADA HEXADA HEXADA TORRES TO	anthene Licrobensene Licrobensediene Licrosyclopentadiene Licroefbane	1000 ug/mL 1000 ug/mL 1000 ug/mL 1000 ug/mL 1000 ug/mL 1000 ug/mL
Part and Locate Reserve 2000 Here and Locate Reserve 2000 Here and Locate Reserve 2000 Here and Locate Reserve 2000 Here and Locate Reserve 2000 Here and Locate Reserve 2000 Here and Locate Reserve 2000 Here and Locate Reserve 2000 Here and Locate Reserve 2000 Here and Locate Reserve 2000 Here and Locate Reserve 2000 Here and Reserve	Part and Locate Received Part and Locate Received 2000		PSTUDENT HERMAN	nne hlorobensene hlorobursdiene hlorogyclopentadiene nloroerbane	1000 ug/mL 1000 ug/mL 1000 ug/mL 1000 ug/mL 1000 ug/mL
Hexachlorobusedtene	Hateachiot cochesces 1000		Hexaelt Hexael	llorobenserve hlorobursalene hlorosyclopentadiene hlorosychane	1000 ug/mL 1000 ug/mL 1000 ug/mL 1000 ug/mL 1000 ug/mL
Heacachlorocatelene 1000	Hexachlorocatience Hexachlorocatience 1000 Hexachlorocat		Hexach Hexach Hexach Hexach Thexach Thexach Thexach Thexach Thexach Thexach	nloroburadiene nlorocyclopentadiene hloroethane	1990 ug/mL 1990 ug/mL 1990 ug/mL 1990 ug/mL
Hexachlorocyclopentediene	Hexachlorocyclopentediene		Hexach Hexach Hexach Trideno T	ulorocyclopentadiene ulorocthane ecane	1000 ng/mL 1000 ng/mL 1000 ng/mL
Hexachlotoethane 1000	Hexachtorothane		Hexach Messach Trackon Trackon Trackon Messach	hloroethane	1000 ug/mL 1000 ug/mL
	The state of the content of the co		Hexade Tradeno Trackon Trackon N-Nitra	ecane	1000 ug/mL
Indemo[1,2,3-3-dijpyrene	Indemo[1,2,3-3-dijpyrene 1000		Thdemo Tsopho n-Nics		1000 na/mt
TSSGNotorie	TSSQNorone TSS		TSOUND N-Neca N-Ntc	of L. S. 3-cd Dyrene	The second of the second of
DS/31/16 Restek, Lot A0102998	Did Did		n-Deca N-With	orone	1000 Mg/mL
N=Niltosodin-D-propylamine 1000	N-Nitrosodin-n-propylamine 1000		N-Mien N-Mien	ane	1000 ud/mL
N=Nitroscolinethylamine	N=11100Scdlmethylamine		N-N1C	mosodi-n-propolamina	1000 we/mt
N=31 to the content of the content	N=31 closediphenylamine 2000			road-dimethy lamine	1000 ng/m1
1000 1000	1000		1	Consocial amend	Tuly control
NajthAllene 1000	Natural Sector Natu		777876	Dosouthieny taming	1000 mayar
Mitrobenzene Mitrobenzene 1000	Nitrobensene Nitrobensene 1000		111111111111111111111111111111111111111	adecense	THE PROPERTY OF THE PARTY OF TH
Secret, Lot A0108988	Secret, Lot A0108988		Naphon	nallene	TOOO md/mr
Phenoid Phenoid Phenoid Phenoid 1000	Secret, Lot A0109988		NICEOB	Denzele	Turn ug/mr
2000 Purena Circama Circama Purena Circama Circama 1000	Sectet, Lot A0108988		Pentac	curocoppenor	2000 ug/mL
Secret, Lot A0108988	2014 16 Restet, Lot A0108988 (Furchased Reagent) Extraction 2000 Extractio		Phenon	HULL CINE	TOOD TOUT
Sector, Lot A0108988	Secret, Lot A0108988		Toronta		THE COOK
08/31/16 Restex, Lot A0108988 (Furchased Reagent) Embroic acid Indensity	08/31/16 Restex, Lot A0108988 (Furchased Reagent) Bensols acid Independent Restex, Lot A0110231 (Furchased Reagent) Bensols acid Independent Restex, Lot A0110231 (Furchased Reagent) 3,3"-11chlosobensidine Bensolds (Furchased Reagent) 2,4,6"-trabromophenol C-Risocophenol C-Risocophenol C-Risocophenol Restex, Lot A082712 (Furchased Reagent) 2.40.6"-trabromophenol Restex (Furchased Reagent) Risocophenol Restex (Furchased Reagent) Risocophenol Risocophenol Restex (Furchased Reagent) Risocophenol Ri		Preside	d t	1000 mg/mr
1 1 1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1 1 1	DR/31/16		2010	2000 no/ml.
Day 1/16 Reiter, Lot A0108989 (Purchased Reagent) Attazine Benzaled Benzeled Benzeled Benzeled Benzeled Benzeled Benz	03/31/16 Restek, Lot A0100999 (Purchased Reagent) Attaine Bensidahyde (Purchased Reagent) Attaine Bensidahyde (Purchased Reagent) 3.3.Dichlorobensidahe Bensidane Bensidane (Purchased Reagent) 2.4 6-Tribhomophenol 2.5 Elucophenol 2.5 Eluco				2000 ng/mL
03/31/1G Restet, Lot A0310231 (Purchased Reagent) 3,3-Dichlotobentidine Benzidence Benzidine Ben	07/31/1G Restex, Lot A0310231 (Purchased Reagent) 3/3-Dichlotobentidine Benzidine 01/12/18 Restex, Lot A092712 (Purchased Reagent) 2.4 6-Tabbromophenol 2.5 Eluorophenol 2.5 Eluorophenol 2.5 Eluorophenol Mitrobenzene-d5 (Surr) p-Terphenyl-d14 (Surr)	D8/31/16 Relter, Lot A0108989		rne	2000 ug/mL
02/31/1G Restek, Lot A0310231 (Purchased Reagent) 5.3-Dichlorobenzidine Benzidine Benz	07/31/16 Restek, Lot A0110231 (Furchased Reagent) 7.3-Lot Decemberations 01/12/18 Restek, Lot B092712 (Furchased Reagent) 2.4.6-Trabromorphenol 2-fluorobaphenol 2-fluorobaphenol 2-fluorobaphenol December 1 Nicrobanzane-d6 (Surr) p-Terphenyl-d14 (Surr)			Ldehyde	2000 ng/mL
07/31/16 Restek, Lot A0110231 (Purchased Reagent) 3,3Dichlorobentidine Bennichte ennicht Ben	07/32/16 Restek, Lot A092712 (Purchased Reagent) 3,3'-Dichlorobenzidine Benzidine Benzidine Benzidine C.4,6'-C'Tiblorophenol 2-Eluorobphenol 2-Eluorobphenol Anticobenzane-d5 (Suzr) p-Terphenyl p-Terphenyl p-Terphenyl D-Terphenyl (Suzr)		Carda	lactan	2000 wg/mL
D1/12/18 Restek, Lot R092712 (Furchased Reagent) 2.4.6-Tichromophenol 2-81uocobancana 2-81uoco	Di/12/18 Restek, Lot A092712 (Furchased Reagent) 2-4.6-Tichtomophenol 2-1 uorobinenyl 2-1 uorobinenyl 2-1 uorophenol 2-1 uorophenol Nicrobensene-d5 (Surr) p-Terbhenyl-d14 (Surr)	07/31/15 Restex, Lot A0110231		Dichlorobenzidine	2000 ud/mL
01/12/18 Restek, Lot R092712 (Purchased Reagent) 2,4,6-Trabromophenol 2-Stuorobrandenyl 2-Stuorobrandenyl 2-Stuorobrandenyl Nitrohemsensensensensensensensensensensensensens	01/12/18 Restek, Lot R092712 (Purchased Reagent) 2.4.6-Tribicomphenol 2-Sinordohymbery. 2-Sinordohymbery. 2-Sinordohymbery. Nitrobensene-d5 (Suri) p-Terphenyl-d14 (Suri)			dine	2000 ng/mL
2-Fluocobphenyl 2-Fluocobphenyl 2-Eluocobhensel Mitchenzela-d5 (Suri) p-Terphenyl-d14 (Suri)	2-Fluodohphenyl 2-fluorophenol Microbemeane-d5 (Suri) p-Terphenyl-d14 (Suri)	01/12/18 Restel, Lot A092712		-Tribromophenol	5000 uq/mL
				orobiphenyl	5000 ug/mL
			2-8100	orophenol	5000 ug/mt.
			Nitrob	benzene-d5 (Surr)	5000 ug/mL
			D-Term	phenyl-dl4 (Surr)	50.00 ng/mL

Table Does Tink Total Does Tink Total Does Tink Does Tink Does Tink Does Tink Does
07/33/16 10/21/15 Wethylene Chloride, Lor 1 mL MB_Listi_INT_00022 600 ME
D7/31/15 10/21/15 Wethylere Chloride, Lot 1 mL M8_Listl_INT_00022 600 mL 1214 0 1 mL M8_Listl_INT_00022 600 mL
1. 7. 4. 7. C. 10. 10. C.
1.2 **Dichard Conference
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1.4 20.0000000000000000000000000000000000
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Telechological and the control of th
2.7 3.4 GTELLAL DESCRIPTION 2.7 3.4 GTELLAL DESCRIPTION 2.7 4.5 TELLAL DESCRIPTION 2.7 4.5 TELLAL DESCRIPTION 2.7 4 GTELLAL DESCRIPTION 3.7 4 GTELLAL DESCRIPTION 3.7 4 GTELLAL DESCRIPTION 3.7 4 GTELLAL DESCRIPTION 4 GTELLAL DESCRIPTION 4 GTELLAL DESCRIPTION 5 GTELLAL DESCRIPTION 6 GTELLAL DESCRIPTION
2. 3. 4. Compared to the compa
2.3 4 6-7 Entrachic or opposite to 1 2.4 5-7 Entrachic or opposite to 1 2.4 5-7 Entrachic or opposite to 1 2.4 5-7 Entrachic or opposite to 1 2.4 5-1 Entrachic or opposite to 1 2.4 5-1 Entrachic or opposite to 1 2.4 5-1 Entrachic or opposite to 1 2.4 5-1 Entrachic or opposite to 1 2.4 5-1 Entrachic or opposite to 1 2.4 5-1 Entrachic or opposite to 1 2.4 5-1 Entrachic or opposite to 1 2.4 5-1 Entrachic or opposite to 1 2.4 5-1 Entrachic or or opposite to 1 2.4 5-1 Entrachic or or opposite to 1 2.4 5-1 Entrachic or or opposite to 1 2.4 5-1 Entrachic or or opposite to 1 2.4 5-1 Entrachic or or opposite to 1 2.4 5-1 Entrachic or or or opposite to 1 2.4 5-1 Entrachic or or or or opposite to 1 2.4 5-1 Entrachic or or or or or or or or or or or or or
8 6 8 5
8 5
4-Wethylphenol 4-Wethylphenol Acetaphthene Acetaphthylene Acetaphthylene Acetaphthylene Antine Antine Antine Benso(alanthracene) Benso(alanthracene) Benso(alanthracene) Benso(alanthracene) Benso(alanthracene) Benso(alanthracene) Benso(alanthracene)
4-Nitrophenol Avenaphthenel Avenaphthylene Avenaphthylene Avenaphthylene Aniline Aniline Aniline Aniline Benso(alanthracene) Benso(alanthracene) Benso(alanthracene) Benso(alanthracene) Benso(alanthracene) Benso(alanthracene)
A-Witcophenol Acengohthylene Acetophenone Anilhae Anthracene Azobenrane Benzolalanthracene Benzolbiluoranthene Benzolbiluoranthene
Acenaphthylene Acenaphthylene Acenaphthylene Aniline Anthracene Acopenene Benso(alanthracene Benso(blinenthene Benso(blinenthene
Acengobtbylene Antiboene Antiboene Antiboenee Antiboenee Antiboenee Benso(alanthracene Benso(alanthracene Benso(alanthracene Benso(alanthracene Benso(alanthracene)
Antine Anthrace Asobersee Berso[a]anthracene Denso[a]anthracene Berso[b]tucrathene Berso[b]tucrathene
Aniline Anthracene Azobenene Benzo[a anthracene Benzo[b Ilucrathene Benzo[chI.Ilperylene
Archemene Archemene Benso(a) anthracene Benso(a) pyrene Benso(a) pyrene Benso(a) pyrene Benso(a) pyrene
Azóbenzene Benzo[alanthracene Benzo[b]flucranthene Benzo[b]flucranthene
Denso(s)anthracene Denso(s)pyrene Benso(s)tylonenthene Benso(s,h, i)pervlene
Benso(a)pyrane Benso(a)t.lucrathane Benso(a,h,liperylane
Benzo[b] fluoranthene Benzo[d,h,l]perylene
Sensold, h, liperylene
Benzofkifluoranthene
Benzo[k]fluoranthene

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Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

				ACCESS OF THE	Parent Reagent	23		
Reagent ID	Exp	Prep	Dilutant	Final	Reagent ID	Volume Added	Analyte	Concentration
							The state of the s	193 000/100
							Daniely of Connection of the Party	100 May 2001
							Bis a children of bennone	TOO MEANING
							Sie (2 onthe Descriptions)	150 ag/mr
							presidential transfer of the control	THE MAY MAN
							darkenela	TOO MAY ME
							Catoscore	THE TRAINE
							uniyeane	100 Mg/mr
							Di-n-butyl phthalate	120 ud/mL
							Di-n-octyl phthalate	120 ng/mL
							Dibenz(a, h/anthracene	120 ug/mL
							Dibenzofuran	120 ug/mF
							Diethyl phthalate	150 ug/mt
							Dimethyl phthalate	120 ug/mL
							Diphenylamine	205.2 ug/mL
							Fluoranthene	120 ug/mL
							Fluorene	120 ng/mL
							Hegachlorobenzene	120 ug/mL
							Hexachlorobutadiene	120 ug/mt
							Hexachlorocyclopentadiene	120 ug/mL
							Hexachloroethane	120 ng/mL
							Hexadecane	120 Mg/mL
							Indenof1, 2, 3-odfovrene	120 ug/mL
							Isophorone	120 nd/mt
							n-Decane	120 Mg/mL
							N-Nitrosodi-n-propylamine	120 nd/mL
							M-Nithosodimethylamine	120 ug/mt.
							N-Nitrosodiphenylamine	240 ug/mL
							n-Octadecane	120 ng/mL
							Naphthalene	120 Mg/mL
							Nitrobenzene	120 ng/mL
							Pentachlorophenol	240 ad/mL
							Phenanthrene	120 ug/mL
							Phenol	120 ug/mL
							Pyrene	120 ug/mL
							Pyttaline	120 ug/mL
							Benzoic acid	120 ug/mL
							Indene	120 ud/mL
							Atrasine	120 ng/mL
							Benzaldehyde	120 ug/mL
							Caprolactam	120 ng/mt
							3,3'-Dichlorobenzidine	120 wg/mL
							Benzidine	120 ug/mL
							2,4,6-Tribromophenol	120 ng/mt
							2-Fluorobiphenvi	120 ug/mL
							2-Fluorophenol	120 ug/mL
							Nitrobensene-d5 (Surr)	120 Mg/mL
							p-Terphenyl-dl4 (Surr)	120 ug/mL
							Phenol-d5	120 ng/mL

Jep No.: 480-89467-1 Lab Name: TestAmerica Buffalo

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	_			Readent	Tradesu Trades	Sail.		
ENT		Prep	Dilutant	Final	Reagent ID	Volume	Analyte	Concentration
07/31/16	+	10/06/15	Methylene Chloride, Lot		10 mL MR LIST STK D0023	In C002	1,1 -8 phenyi	200 ag/mL
			121470				TO S. E. Statement Consideration	Total and Total
							1 o A-The ablaction of the	SOO REVENT
							1. W. Dight orobensens	200 nev/mt.
							1.2-Dinhanvihodravine	200 weight.
							1.3-Dichlorobenzene	200 ng/ml.
							1 3-Dinitrohansana	SON WAYNE.
							1 4-11 of orchangene	200 vovm.
							1 AcTionson	Sad working
							2 Mechanic selections	AMPROVE COM
							1-Mernythaburnarene	THI / DO DO 2
							2,2 -oxybis[1-chloropropane]	200 ug/mL
							2, 3, 4, 6-Tetrachlotophenol	200 ng/mL
							2, 4, 5-Trichlorophenol	200 ug/mL
							2,4,6-TrichIcrophenol	200 uq/mL
							2.4-Titchlorophenol	200 ug/ml.
							2 4-Dimethylohenol	900 vov.mt.
							2 d-nonember of	ADD WASHI
							Constitution of the state of th	AND UST UNIT
							2,4-Dinitrotoluene	ZOO nd/mr
							2,6-Dichlorophenol	200 ug/mL
							2,6-Dinitrotoluene	200 ug/mL
							2-Chloconaphthalene	200 ng/mL
							2-Chlorophenol	Z03 MG/mL
							O Mothy Insphripations	Taylor colo
							a marging burners	THE CONTRACTOR
							z-Methylphenol	2000 ng/mb
							2-Nitroanlline	200 ug/mL
							2-Nitrophenol	200 ng/mL
							3-Nitroamiline	200 Mg/mL
							4.6-Dinitro-2-methylphenol	400 per/mi.
							d-Bromonhany nhany ather	300 scr/ml.
							Anthropical prompt conce	200 ng/m1
							A-Chlorophilino	San saver.
							A-Chlorophany phanol ather	200 nor/ml
							A Monther of Section 1	1m2 200
							a state of the sta	mu / Ser Co. 2
							4-Nitrogniline	TILL REVIEW
							4-NILLopnenor	4 00 tg/mr
							Acenaphthene	200 ug/mL
							Acenaphthylene	200 ug/mL
							Acetophenone	200 ng/mL
							An_line	Z00 wq/mL
							Anthracene	200 ng/mL
							Azobenzene	JOO NOVEL
							Donest a series	1m/2m 000
							To the control of the control	A STATE OF S
							senzo(a)pyrene	200 ng/mL
_							Benzo[b]fluoranthene	200 ug/mL
							Bensolg, h, 1]perylene	200 ug/mL
	_						Benzo[k]fluoranthene	200 ng/mL
_							Benzyl alcohol	200 ug/ml.

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 48D-89467-1

Reagent 1D Rare Figs Figs Modume Mod	Exg Prep Dilutant Final Reagent ID Used Volume Reagent ID We List of the Control of the Contro	Neagent ID Added	Analyte	
Bit (2-ch) (oceative) methods				Concentration
## 10 compared to the compared		B B B B B B B B B B	s(3-chlocoethoxy)methane	200 ug/mL
B S S C S C S C S C S C S C S C S C S C		181 181 181 181 181	s(2-chloroethyl)ether	200 ug/mL
Supplementaries Supplementaries Supplementaries		10 m	s(2-ethylhexyl) phthalate	200 ug/mL
Carbonous Carb		77	tyl benzyl phthalate	200 ug/mL
District Control		3	rbazole	200 ug/mL
Discrete Discrete		CD.	rysene	200 ng/mL
Districtly District		TO	-n-butyl phthalate	200 ng/mL
Disease An authoricene Disease An authoricene Disease Distribution Disease Distribution Disease Distribution Distribution Distribution Distribution Handle Distribution		DI	-n-octyl phthalate	200 ug/mL
Defectory Defection		Id	henz (a, h) anthracene	200 ug/mt.
District Ditable set		TG	benzofuran	200 ug/mL
Ditachty Dribaists Ditachty Dribaists		Di	ethyl phthalate	250 ug/mL
Piptenylatine		10	methyl phthalate	200 ug/mt.
The control of the		Di	phenylamine	342 ug/mL
Head of the control		EI	noranthene	200 ng/mL.
Headelloughteatene		H	horene	200 ug/mL
Hexachicococyclopatadiene Hexachicococyclopatadiene Hexachicococyclopatadiene Hexachicococyclopatadiene Hexachicococyclopatadiene Hexachicococyclopatadiene Hexachicococyclopatadiene Hexachicococyclopatadiene Hexachicococyclopatadiene Hexachicococochicochicochicocochicocochicocochicocochicocochicocochicocochicocochicocochicocochicocochicocochicocochicocochicocochicochicochicochicochicochicochicochicochicochicochicochicochicochicochicochicochicochic		He	xachlorobenzene	200 ng/mL
Hexaell.corotylopeitadisne		He	xachlorobutadiene	200 ug/mL
Hexachloucethane		He	xachlorocyclopentadiene	200 ug/mL
Harder of the Carlot		He	Kachloroethane	200 ug/mL
Indead (1.2.3 - cd)gytene		He	xadedane	200 ug/mL
The case The case		In	deno[1, 2, 3-cd]pyrene	200 ug/mL
The came The came		IB	ophorone	200 ug/mL
N=Nitroscolenethylamine		-g	Decame	200 ng/mt
N-Nitrosodinethylamine		- N	Nitrosodi-n-propylamine	200 Ng/mL
W-Mittecsoliphenylamine W-Mittecsoliphenylamine M-Mittecsoliphenylamine M-Mittecsoliphenol		-N	Nitrosodimethylamine	200 ug/mL
Incompage Inco		- N	Nitrosodiphenylamine	400 ug/mt.
Machine		1.0	Octadecane	200 ug/mL
NA trochestere Pentachiotophenol Pentach		Ma	phthalene	200 ng/mL
Pentachilotophenol Pentachilotophenol		EN.	trobenzene	200 ug/mL
Phenathrene Phenathrene Phenathrene		PG	ntachlorophenol	400 ug/mL
Phenol Phenol Pytente Pytent		4d	enanthrene	200 ng/mL
Pytene P		ud.	enol	200 ug/mL
NB_LISIO_STW_00002		Py	rene	200 ng/mF
MR Lisil STK D0002 1000 ul Benzole acid Indems Indem			rigine	200 ug/mL
Inches		3000 nr	nzole acid	200 ug/mL
MR_LISTE_00002			dene	200 ug/mL
Machine Caprolatenyde Caprolatenyde Caprolatenyde Caprolatenyde Caprolatenyde Caprolatenyde Machine Caprolatenyde S.4.6-Tibrophenol C.4.6-Tibrophenol C.4.6-Tibrophenol C.4.6-Tibrophenol C.4.6-Tibrophenol C.4.6-Tibrophenol Mitrobensene-d5 (Surt) PrTerphenyl-d14 (Surt) Phenol-d6 Caprolatenyl-d14 (Surt) C.4.6-Tibrophenol C.4.6-Tibrophenol Mitrobensene-d5 (Surt) C.4.6-Tibrophenol		1000 uL	razine	200 ug/mL
Ma_LISS_STW_00002		989	nzaldehyde	200 ug/mL
MR_LISS_STW_00002			prolactam	200 ug/mL
MR SURA STR 00042 400 ul 2,4,6-dine Berzeline 2,4,6-dine 2-filosophenol 2-filos		1000 07	3Dichlorobenzidine	200 ng/mL
NB 91R3 57K 00042			nzidine	200 Mg/mL
2-rinotosipheny. 2-rinotosipheny. 2-rinotosipheny. Nitrobense=e5 (Surt) p-Terphenyl-di4 (Surt) Phenol-d5 Lot A0111934 (Surchased Reagent) 1,1-Ribhenyl 1		400 nl	4,6-Tribromophenol	200 ng/mL
All Colors All		-7	a noronipheny	OOO notal
12/31/16 Restet, Lot A0111934 (Butchased Reagent) 1.1Hipheny1 1		7	Tomandorna	Amybu doz
Partein Peette No. 11934 (Surchased Reagent) 1.1 Eighenyl 1		NI	trobenzene-d5 (Surr)	200 ug/mL
12/31/16 Rester, Lot 00111934 (Butchased Reagent) 1.1Hiphenyl		1		200 Mg/mL
12/31/16 Restet, Lot A0111934 (Butchased Reagent) 1,1"-Biphenyl			enol-d5	200 ug/mL
	.12/31/16 Resteb, Lot A0111934		1Hiphenyl	1000 ng/mL

Concentration

11/13/2015

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Test
Name:
Lab

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REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 48D-89467-1

				C. C. C. C. C. C. C. C. C. C. C. C. C. C				
Reayent ID	EMp	Prep	Dilutant	Final	Reagent ID	Volume	Analyte	Concentration
							Bis(2-ethylhexyl) phthalate	3000 ug/mt
							Buryl benzyl phthalate	
							Carbazole	1000 ng/mL
							Chrysene	1000 ug/mL
							Di-n-butyl phthalate	
							Di-n-octyl phthalate	
							Dibenz(a, b) anthracene	1000 wg/mE
							Dibenzofuran	
							Diethyl phthalate	1000 ug/mL
							Dimethyl phthalate	1000 ug/mL
							Diphenylamine	1710 ug/mL
							Fluoranthene	
							Fluorene	1000 ug/mL
							Hexachlorobenzene	1000 ng/mL
							Hexachlorobutadiene	
							Hexachlorocyclopentadiene	1000 ng/mL
							Hexachlonosthane	1000 ug/mL
							Hexadecane	3000 ug/mL
							Indeno[1, 7, 3-cd]pyrene	1000 ng/mL
							Isopharone	1000 ug/mL
							n-Decane	1000 ng/mL
							N-Natrosodi-n-propylamine	1000 ug/mL
							N-Nitrosodimethylamine	1000 ng/mt
							N-Nithosodiphenvlamine	2000 Mg/mL
							n-Octadecane	
							Nanhthalene	
							Nirrohansana	
							Pentachlorophenol	
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1							Benzaldehyde	2000 ug/mL
							Caprolactam	2000 ug/mL
MB L189 STE 00002	01/15//0		Restek, Lot ADIIO231		(Furchased Reagent)	tt)	3,3"-Dichlorobengidine	2000 ug/mL
			The second secon		The second second second second		Benzidine	2000 ug/mL
ME SURR STK 00042	01/13/18		Rester, Lot A092712		(Eurohased Reagent)	(t)	2,4,6-Tribromophenol	5000 ng/mL
							2-Sluorobiphenyl	5000 ng/mL
							- 1	
								5000 ug/mt
							p-Termhenyl-dl4 (Surr)	5000 ug/mL
							Shenol-d5	5000 ug/mL
MB LISTI WRK 00221	07/31/16	10/26/15 M	8 10/28/15 Methylene Chloride, Lor	5 mL MP	mL ME Listl INT 90022	1250 ul	Acenaphthene	50 ng/mE
		-	10000				Acenaphthylene	50 ug/mL
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REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

Respect ID Race Date Direct Titled Nothing Nothing Respect ID Nothing R					Toolegan	Patent Reagent	-11		
Authorities Authorities	Reagent ID	EMp	Prep	Dilutant Used	Final	Reagent ID	Volume	Analyte	Concentration
Particle Particle								Anthracene	7m/50 nd/mr
Berrio Communication								Benzo[a]anthracene	50 ng/mp
Big Big								Benzo[s]pyrene	20 ng/mF
### ### ### ### ######################								Benzo[b]flucranthene	50 ng/mL
12/31/16 10/09/15 Restrict, Lot NOTIL339 Restrict Lot NOTIL Lating Collisions								Benzo[g,h,i]perylene	Pu nd/mT
01/31/16 10/09/15 Pettylene Chloride, Lot 10 ml KB_LiSi_STR_000/2 2000 10 kernelee 12/00 kerneleee 12/00 kerneleeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee								Benso[k]fluoranthene	50 ng/mL
Tile can be a substitute of the control of the co								Christian	50 ver/mt.
Since and see								Dibertal's blantbradence	So warded
12/47/16 10/03/15 Wethylene Chloride, Lot 10 mL RB_Lish_STR_00023 2000 ul Acenghirdene 2 Figure								The same has been amounted and	The Sea of
12/31/16 10/09/15 Nestex, Lot A011339 Sestex, Lot A011339 12/31/16 Nestex, Lot A011339 Sestex,								Transmene	July Da Oc
Machiniene Machiniene Machiniene Phenanthiene Phenanthie								Fluorene	50 ug/mL
### SPECIAL PROPRIES PREMISE								Indenc[l, 2, 3-od]pyrene	50 ug/mL
Patenta Phenomenol								Naphthalene	50 ug/mt
17/31/16 10/02/15 Westlylens Chloride, Lot 10 mL ME LASI STR 900/23 2000 up Prepare								Phenanthreze	50 ug/mL
2.4 f = Till Recomplessol								Pyrene	50 ng/mL
2 = 210 octoby brund								9.4 C-Try bronombanol	50 vovm1.
No. No.								The state of the s	100 Car 00
Nit tobergreen of Surry								z-zanoronibilanya	THE SECOND
Mail								- 1	SU MEY ME
Direct Description								- 1	50 ug/mL
12/31/16 10/09/15 We Livie									50 ug/mL
0)/31/16 10/09/15 Wethylene Chloride, Lot 10 mL We Lisi_STR_D0023 2000 uL Acenaphthylene Additionanthee Benzo[e] anthracene Benzo[e] anthracene Benzo[e] anthracene Benzo[e] plucene Benzo[e] plu								Phenol-d5	Tu/50 05
121470 121470	.MB Listl INT 00022	-	10/09/15	Methylene Chloride,	10 mL 1	MB LIST STR 00023	2900 ut	Acenaphthene	200 ng/mL
Acensolid and the Additional Additional Additional Additional Benzo(b) Electron (c) (c) (d) (d) (d) (d) (d) (d) (d) (d) (d) (d				121470			1		
Mail								Acenaphthylene	200 ng/mL
Sester, Lot A0111934 Sester								Anthracene	200 ug/mL
Sester, Lot Apill334 Sester Sester								Benzofalanthracehe	200 uc/mh
Restex, Lot A0111934 Restex, Lot A0111934 Restex Restex								Benzo[a]pyrene	200 uq/mL
Benzofg/h,ijperylene Benzofg/h,ijperylene Chrysene Chryse								Benzolbifluoranthene	200 ng/ml.
Sester, Lot A011534 Surekased Reagent Remodification Sester, Lot A011534 Surekased Reagent Remodification Surekased Remodification Remodification Remodification Surekased Remodification Remodif								Benzole, h. ilberylene	200 uc/mL
Chrysene Chrysene Chrysene Chrysene Chrysene Fluoranthene								Renzof 21 fluoranthene	200 uc/mi.
Sester, Lot A0111934 Sester Sester								Chrysene	200 ng/mt.
Fluctanthene Fluctanthene Fluctanthene Indexend Naphthalene Phenanthrene Phenathrene Phenanthrene Phena								Dibenz (a. h) anthracene	200 uc/mL
Figure F								Fluoranthene	200 ng/mL
Indensity 2,3-cdipytene Rabenathatene Raphathatene Papenathatene Pap								Fluorena	200 ser/ml.
Najhthalene Najhthalene Phenanthrene Phenan								fudencil 2 3-relinorens	200 waynt
Parametricane Parametrican								Manhathal one	Tanker Con
Rester, Lot A0111934 Surrange Rester								Dhanonthrana	Im/50 005
RB_SURR_STK_00042 400 ut_2.4.6-Tribromophenol_ 2-Sluorobiphenyl_2-12/00000000000000000000000000000000000								Distriction of the Control of the Co	THE PERSON
Restex, Lot A0111934 Statement Respect Respect Recognition R					1.	A COUNTY OF THE PARTY OF THE PA		Pyrene	ZUO UGY ML
Sester, Lot A0111934 Surchased Reagent Actor					-	MB BURN BIR DUDAZ	400 at	Z, 4, 6-1 Libromophenci	700 nd/mr
Rester, Lot A0111934 (Surchased Reagent) Acenghithene Anthracene Renof althorone								2-Fluorobiphenyl	200 ng/mL
Nitroberscane-d5 (Surr)								- 1	200 wg/mL
P-Terphenyl-dl4 (Suri) P-Terphenyl-dl4 (Suri) Phenol-d6 Ph									200 ug/mL
12/31/16 Rester, Lot A0111934 (Eurchased Reagent) Acenghithene Action Ac								100	200 ng/mL
12/31/16 Restax, Lpt A0111934 (Eurchased Reagent) Acenaphthene Acenaphthylene Antheadene Benzof allahitacene Benzof allahitacene								Phenol-d5	200 ug/mL
Acenaphthylene Anthracene Benzof alanthracene Ennof alanthracene	MB LIST STX BBB23	12/31/16		Rester, Lot A0111934		(Enrohased Reagen	£)	Acenaphthene	1000 ag/mL
eite								Acenaphthylene	1000 mg/mL
thtacene								Anthracene	1000 ug/mL
								Benzolalanthracene	1000 ng/ml.
								Renacialminana	1900 norm

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Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

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Pacagant 10 10 10 10 10 10 10 1					The second	Parent Reagent			
### 100 Pastek, Lot A010950 Clurchaed Regent 100 Pastek Lot A010950 Lot A0	Reagent ID	EMp	Prep	Dilutant	Final	Reagent ID	Volume Added	Analyte	Concentration
## 10/29/16 10/29/16								Domon Flot Flue rome banc	2 March and Cont.
### 100 Chicago Chicag								Design of the contraction of the	AND AND SOCIAL
The control of the								Benzolg, n, 1 perylene	TOTAL REVER
10 10 10 10 10 10 10 10								Sensol Altinoranchene	TOOO REVEN
1000000000000000000000000000000000000								District of the section	THE PERSON WAS THE
Tradeon [1, 5] = Company Tradeon [1, 5] = Collegement 1000								Checking at it amendacene	TOO MAY WELL
Training 12,3-cd Seetat, Lot A092312								Thomas	1000 wer/mt.
Picture Character, Loc No22712 Cauchared Reagent Picture Character 1000								Indeno 1 2 3-od increne	1000 na/ml
The complete comple								Month halons	3000 Novem
### Part Part								Dhenanthrene	1000 ng/mL
## 08/12/16								Person	1880 ng/mf.
10 10 10 10 10 10 10 10	. ME SURE STE DODAS	01/12/18		Restell, Lot A092712		(Furchased Reade	nt)	2.4.6-Tribromophenol	5000 ud/mL
								2-stucrobiobenvi	5000 ng/ml.
106/01/16 10/07/15 Wetbylene Chloride, Lor 10 mL Ma_1M787D_STR_00013								2-Finorophenol	5000 ng/mL
10 10 10 10 10 10 10 10								a.	5000 ng/mt.
14 15 10 11 14 15 15 15 15 15 15									Sand again.
05/01/16 10/07/16 Wethylene Chloride, Lor 10 mL MB JMT8TD_STK_00013 1 mL 1,4-Dichlorobensene-d4 200					Ī			- 1	5000 uc/mL
## 1,729/20 1,2685	20000 0000	200000000000000000000000000000000000000	41-	A STATE OF THE PARTY OF THE PAR		Charles come of the contract of	1		2000
Accomplishment of the constraint of the constr	ME TITTO MEN DOGS	007 077 076		TIRESE	1	NINGSTR SILE COURTS	16 1		TH /BH 6002
Chrysene-dil				1000001				Acenaphthene-did	200 neval.
Sestek, Lot 2019360 Surnhased Reagent Servience 18 200								The state of the s	THE SECTION OF
Packet, Lot A0109500 (Furnhased Reagent) Packets-color P								the state of the s	10 10 10 10 10 10 10 10 10 10 10 10 10 1
22/29/20 Restet, Lot A0109560 (Furnhased Reagent) 1.4 -Dichlocobencene-d4 2000 Chrysme-d12 2000 20								Naphthallene-ds	700 pg/UL
20/23/20 Restex, Lot A0109360 (Furchased Reagent) 1.4-Dichlocheneedd 2000								Perylene-diz	Ta Abu or 7
D2/29/20 Nester, Lot A0109560 (Furnhased Reagent) A-chickbearsene-d4 2000								Phenanthrene-dlu	ZOG DG/EL
According to the control of the co	MB INTSTD STK 00013	02/29/20		Restel, Lot A0109360		(Furnhased Reage	nt)	1,4-Dichlorobenzene-d4	2000 ng/mL
Comparison								Acenaphthene-did	2000 ag/mL
Naphthaletre-d8 2000								Chrysene-d12	
Phenanthreps-did 2000								Naphthalene-d8	Z000 ng/mL
04/28/16 10/28/15 ACETONE, Lot 3032536 100 mL 8270 List1/10 00005 5 mL 8-20-chlorobensidine 100 8270 List1/10 00005 5 mL Benzolc acid 100 8270 List1/11 00006 5 mL Benzolc acid 100 100 Cagrolactam 100 Cagrolactam 100 Cagrolactam 100 Cagrolactam 100 Cagrolactam 100 1.2.4.5-Tetrachlorobenzene 50 1.3.5-Unitobenzene 50 1.3.5-Unitobenzene 50 1.3.5-Unitobenzene 50 1.3.5-Unitobenzene 50 1.4-Dichlorobenzene 50 1.4-Dichlorobenzene 50 1.4-Dichlorobenzene 50 1.4-Dichlorobenzene 50 1.4-Dichloropengane) 50 2.2cogbostluchoropengane) 50 2.2cogbostluchoropengane) 50 2.2cogbostluchoropengane) 50								Perylene-dl2	2000 ng/mL
04/28/16 10/28/15 ACETONE, Lot 3032536 100 mL 8270 List1/10 00005 5 mL Benzolc acid 100 8270 List1/10 00005 5 mL Benzolc acid 100 8270 List1/11 00006 5 mL Benzolc acid 100 000 000 000 000 000 000 000 000 00								Phenanthrene-di0	
8270 List1/10_00005 5.mL Bensolc acid 1 8270 List1/1_00006 5.mL Attazine 1 8270 List1/1_00006 5.mL Attazine 1 8270MegaMix_00028 5.mL List245.etam 1 1,2.4.5.mloloobenzene 1,3.0.mloloobenzene 1,3.0.mloloobenzene 1,4.0.mloloobenzene 1,4.0.mloloobene	O 8270/625LCS 00048	04/28/16	-	ACETONE, Lot 3032536	100 mt. 8	270 List 1/S CODO6	5 1112		
5 mb benzouc acid 5 mb Areazine Benzildehyde Caprolactam 1.1 "Exphenyl 1.2,4 "Cartachercene 1.2 "A" "Cartachercene 1.3 "Dichlorobensene 1.3 "Dichlorobensene 1.3 "Dichlorobensene 1.3 "Dichlorobensene 1.3 "Dichlorobensene 1.4 "D								Benzidine	100 ug/mL
Indepe 5 mL Remaine 1 Benzaldebyde Caprolactam 1 1"-Epheny 1 2,45-Tetrachlorobenzene 1 2-Duchlorobenzene 1 3-Duchlorobenzene 1 3-Duchlorobenzene 1 4-Duchlorobenzene 1 4-Duchlorobenzene 1 4-Duchlorobenzene 1 4-Duchlorobenzene 2 2-Coxydane 3 2 2-Coxydane 3 2 2-Coxydane 3 2 2-Coxydane 3 2 2-Coxydane					00	270 List1/10 00005	5 mil	_	100 ng/mL
5 mL Attatine Find Line and Captolactem In 2, 4,7-retrandiorobenzene 1,2,4-retrandiorobenzene 1,2,4-retrandiorobenzene 1,2-retrandiorobenzene 1,3-retrandiorobenzene 1,3-retrandiorobenzene 1,4-retrandiorobenzene 1,4-retrandiorobenzene 1,4-retrandiorobenzene 1,4-retrandiorobenzene 1,4-retrandiorobenzene 1,4-retrandiorobenzene 1,4-retrandiorobenzene 2,2-vexybisal-chloropiopiopiane]									100 ug/mL
Benzaldehyde Caprolactan 1.1.*-Biphenyl 1.2.4.*-Tichhenyl 1.2.4.*-Tichhenyl 1.2.5.0.*-Tichhenzene 1.3Dichhorbenzene 1.3Dichhorbenzene 1.3Dichhorbenzene 1.4Dichhorbenzene 1.4Dichhorbenzene 1.4Dichhorbenzene 1.4Dichhorbenzene 1.4Dichhorbenzene 1.4Dichhorbenzene 1.4Dichhorbenzene 1.4Dichhorbenzene 2.2.*-oxybisil_achloropingane]					90	270 listl/11 00006	5 m		100 ng/mL
Captolactam 5 mL 1.1.* Exphenyl 1.2.4 5-Tetrachlorobenzene 1.2.4 4-Trzchlorobenzene 1.3-Dtchlorobenzene 1.3-Dtchlorobenzene 1.4-Dtchlorobenzene 1.4-Dtchlorobenzene 1.4-Dtchlorobenzene 1.4-Dtchlorobenzene 1.4-Dtchlorobenzene 1.4-Dtchlorobenzene 2.2.*-Oxybixellachene 2.2.*-Oxybixellachene								Benzaldehyde	100 ng/mL
5 mi 1.1° Eiphenyi 1.2°,4° Terrachiorobenzene 1.2°,4° Terrachiorobenzene 1.2° - Dichlorobenzene 1.5° - Dichlorobenzene 1.5° - Dinitrobenzene 1.4° - Dinitrobenzene 1.4° - Dichlorobenzene 1.4° - Dichlorobenzene 1.4° - Dichlorobenzene 2.4° - Ostybis all - chloropropane) 2.2° - Ostybis all - chloropropane)								Caprolactam	100 ug/mL
1.2, 4 "-fartrachtorobenzene 1.2, 4 "rochlorobenzene 1.2-buch orobenzene 1.3-buch orobenzene 1.3-buch orobenzene 1.4-buch orobenzene 1.4-buch orobenzene 1.4-buch orobenzene 1.4-buch orobenzene 1.4-buch orobenzene 2.2-coxpts.1-chloropropane					0	8270MegaMix 00028	5 min	_	50 ng/mL
								1,2,4,5-Tettachlorobenzene	SO ug/mL
								1,2,4-Trachlorobenzene	50 ng/mt
								1.8-Dichlorobenzene	50 wa/mE
								1,3-Dichlorokenzene	50 ud/mL
								I.3-Dinitrobenzene	50 ng/mt
								1.4-Dichlorobenzene	50 ug/mL
								1.4-Diomane	SO novine
								1-MethyInaphthalene	50 Mg/mL
								2,2 -cxvbis[1-chloropropane]	50 ng/mL

REAGENT TRACEABILITY SUPMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

Rearest In	ENT	Prep	Dilutant	Final	W Treatest Th	Volume	e tyle and	Concentration
all and	nana	nana	magn	ASTRING		1	MIGHT LE	CONCERN BELOW
							2,3,4, e-Tetrachiorophenol	20 mg/mp
						-10	2,4,5-Trichlorophenol	50 ng/m[
							2,4,6-Trichlorophenol	50 ng/mL
							2,4-Dichlorophenol	50 ng/mL
							2,4-Dimethylphenol	So ug/mL
							2,4-Dimitrophenol	160 nd/mL
							2 4-Dimitrofolden	50 verting
							A C N. L. C.	100000000000000000000000000000000000000
							2, 6-Dichiorophenol	m/pa ng/mi
							2,6-Dinitrotoluene	50 hg/mL
							2-Chloronaphthalene	50 no/mL
							3.061 orreshend	Turing Co.
						-1	Tomandon Toman	20 40/100
							2-Methylnaphthalene	SO LG/ML
							2-Methylphenol	50 ug/mL
							2-Nitroaniline	50 ng/ml.
							7 Tre transfer on 1	Ten your Did
							P-Manufactural Control of the Contro	mi/ha ne
							3-Methylphenol	Jm/ga og/mL
							3-Nitboaniline	50 ug/mL
							A S. Dinibus, S. makker Inhana	100 2007
						-1	4, 6-11.11.12.10-2-metny.pneno.	TOG REVIEW
							4-Bromophenyl phenyl ether	50 ug/mL
							4-Chloro-3-methylphenol	50 ug/mL
							A CALL OF THE PARTY OF THE PART	100
							4-Chloroanicine	amypu be
							4-Chlorophenyl phenyl sther	50 ug/mL
							3-Matherment	50 welnut
							Tomat Tomat a	THE PART OF
							4-Nittoaniline	50 Mg/mL
							4-Nitrophenol	100 ng/mL
							2 concentrations	EO worker
							Scenaphenene	The order
							Acenaphthylene	SO DO/ME
							Acetophenone	50 ug/mL
							Designa	50 actint.
							Care a series	EQ worker
							Anchracene	an ug/min
							Azobenzene	50 ng/mL
							Benso[a]anthracene	So ug/mL
							Benzolalpyrene	50 ng/mL
						-	Benzolbifluoranthene	50 ug/mL
							Domondo la dimensional and	100/100
						1	pensold, n. 1 perylene	MIN 1837 MIN
						-40	Rengol & Ithoranchene	So agame
							Benzyl alcohol	50 ng/mr
							Bis (2-chloroethoxy) methane	50 ug/mL
							Bis(2-chloroethyl)ether	SO ROYME
							Bis (2-athvihexvi) ohthalate	50 novm
							Butter Bearing of the ball at	EO 1111
						1	Bucks delloys pliculated	my Sa oc
							Carbazole	an ag/mL
							Chrysene	50 ng/mL
							Di-n-butyl phthalate	50 ttg/mL
							Di-n-ortv nhthalate	50 ng/ml.
							Dibbos branthragan	50 writing.
							Day on a character	50 con 200
							Disting of the late	50 way mil
				7			necessary Support	in the or

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

			the state of the s	Patent Reagent	1		
Reagent ID	EMP	Prep	Dilutant Final Volume	Reagent ID	Volume Added Analyte	Ð	Concentration
					Dimethyl phthalate	â	50 uq/mt
					Diphenylamine		85.5 ng/mF
					Fluoranthene		50 ng/mL
					Fluorene		50 ng/mL
					Hexachlorobenzene		SO ug/mL
					Hexachlorobutadiene	18	50 ng/m
					Hexachlorocyclopentadiene	tadiene	7m/5n 65
					Hexachloroethane		50 ug/mL
					Hexadecane		50 ug/mL
					Indeno[1, 2, 3-od]pyrene	/rene	SO uq/mL
					Isophorone		50 ug/mL
					n-Decane		50 ug/mt
					N-Nitrosodi-n-propylamine	ylamine	50 ug/mL
					N-Nitrosodimethylamine	umine	100 ug/mL
					N-Nitrosodiphenylamine	amine	100 ug/mL
					n-Octadecane		SQ ug/mL
					Naphthalene		50 ug/mL
					Nitrobenzere		50 ug/mt
					Pentachlorophenol		100 ug/mL
					Phenanthrene		Jm/pn 05
					Phenol		50 ng/mr
					Eyrene		50 ug/mL
The state of the s				A COLUMN TO THE REAL PROPERTY OF THE PERSON			50 ng/mt
.8270 List 1/8 00006	01/31/17		Restek, Lot A0112567	(Furchased Reagent		dine	2000 Mg/mL
					Benzidine		2000 ug/mL
.8270 List1/10 00005	08/31/16		Restel, Lot A0108988	(Burchased Reagent)	Benzoic acid		2000 ug/mL
							2000 ug/mL
.8276 listl/11 00006	01/31/17		Sester, Lot A0112321	(Furuhased Readent)	Atrazine		2000 ng/mL
							2000 Mg/mL
					Caprolactam		2000 ug/mL
.O 827UMegaMix 00028	12/31/16		Restek, Lot A0111934	(Furchased Reagent			1000 ng/mL
					1, 2, 4, 5-Tetrachlorobenzene	cobenzene	1000 ug/mL
					1,2,4-TrichIcrobenzene	izene	1000 ug/mL
					1,2-Dichlorobenzene	ie.	1000 ug/mL
					1,3-Dichlorobensene	le l	3000 ng/mL
					1, 3-Dinitrobenzene		1000 ng/mr
					1,4-Dichlerobenzene	ie.	1000 ug/mL
					I,4-Dloxane		1000 ug/mL
					1-Methylnaphthalene	ie	1000 ug/mL
					2,3 oxybis[1-chloropropane	ropropane]	1000 ng/mL
					2, 3, 4, 6-Tetrachloropheno	rophenol	1000 wg/mr
					2, 4, 3-Trichlorophenol	noi	1000 ng/mL
					2, 4, 6-Trichlorophenol	Lone	1000 ug/mt
					2,4-Dichlorophenol		1000 ug/mL
					2,4-Dimethylphenol		1000 ng/mL
					2.4-Dimitrophenel		2000 uc/mt.
					2.4-Dinitrotoluene		1000 ud/mL
					2,6-Dichlorophenol		1000 ng/mL

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Jap No.: 480-89467-1 Lab Name: TestAmerica Buffalo

				Tagarant	Patent Reagent	1		
Reagent ID	EMP	Prep Date	Dilutant	Final	Reagent ID	Volume Added	Analyte	Concentration
							2.6-Dinitrololuene	1000 mg/mt
							2-Chloronaphthalene	1000 ng/mL
							2-Chlorophenol	1000 ng/mL
							2-Methylnaphthalene	1000 ng/mL
							2-Methylphenol	1000 ug/mL
							2-Nitroshilihe	1000 ng/mr
							2-Nitrophenol	1000 Mg/mL
							3-Methylphenol	1000 ug/mL
							3-Nitroaniline	1000 ng/mt
							4,6-Dinitro-2-methylphenol	2000 ug/mL
							4-Bromophenyl phenyl ether	1000 ng/ml
							4-Chloro-3-methylphenol	1000 ug/mt
							4-Chlocoaniline	1000 ug/mL
							4-Chlorophenyl phenyl ether	1000 ng/mL
							4-Methylphenol	1000 ug/mL
							4-Nitposniline	1000 ug/mL
							4-Withophanol	2000 ner/ml.
							Branaphthana	\$000 na/mt.
							Acenanhthylene	
							Toptonhenone	1000 no/ml.
							de la la la la la la la la la la la la la	1000 may
							An the	THAT BOOK
							Anthracene	TOOO nd/mr
							Azobenzene	1000 ng/mt
							Benzo[a]anthracene	1000 Mg/mL
							Benzo[a]pyrene	1000 ug/mL
							Benzo[b]flucranthene	1000 ng/mt
							Benzolg, h, ilperylene	1000 ug/mL
							Benzolk fluoranthene	1000 ng/mF
							Benzyl alcohol	1000 wg/mL
							Bis (2-chloroethoxy) methane	1000 ug/mL
							Bis(2-chloroethv1)ether	1000 ng/mL
							Bis(2-ethylhexyl) phthalate	1000 ug/mL
							Bucyl Densyl phthalate	1000 ng/mL
							Carbazole	IOOO nd/mL
							Chrysene	1000 ng/mL
							Di-n-butyl phthalate	1000 ng/mr
							Di-n-octyl phthalate	1000 ug/mL
							Dibenz(a, h) anthracene	1000 ug/mL
							Dibengofuran	1000 ng/mF
							Diethyl phthalate	1000 ng/mt
							Dimethyl phthalate	1000 Ng/hL
							Diphenylamine	1710 ug/mL
							Fluoranthene	1000 ug/mL
							Fluorene	1000 ng/mL
							Hexachlorobenzene	1000 ng/mL
							Hexachlonobutadiene	1000 ug/mL
							Hexachlorocyclopentadiene	1000 ug/mL
							Hexach orosthane	1000 nd/mL

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Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

Early Dilitation Volume Reagent ID Notice Management ID Notice Notic					10000	Pacent Reagent	222		
This part of the	Reayent ID	EMp Date	Prep	Dilutant	Final		Velume	Analyte	Concentration
Totalin Le 3 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 -								Hexadecane	1000 ag/mL
								Indensity 2.3-odinyrene	1000 ac/mt.
PARTICIONALISTON PARTICIONALIST 2000								Tachhorona	1000 ng/mI.
PARTIC COROCITORIST PARTIC COROCITORIST 2000								T-Decame	1000 vovmt.
NOT 11 CONTINUE NOT 11 CON								N-Nitrosodi-n-propolamina	3000 mr/ml.
PATE PATE								M.Weterocoldimethod amine	Shirt warmer
The control of the								N. W. C. COCCLINE CHY TANKING	THE POOR
Mapplicature Mapp								N-Nitrosodiphenylamine	2000 NG/ML
Nucleotistic Nucl								n-Octadecane	1000 ug/mL
Particular Conference 2000 Particular Conference 2000								Naphthalene	1000 ng/mt
Phrinathtene 1900								Mitrohenzene	1000 ug/mL
Phanol. Phan								Pentachlorophenol	2000 ng/mr
Pytroth								Phenanthrene	1000 ng/mL
Pytrdine								Phenol	1000 ng/mL
Pytiding Pytiding								Pyrene	1000 ng/mL
04/09/16 10/27/15 AcETONE, Lot 3032236								Pyridine	1000 ng/mr
Pentalilie	S270LL LCS 00032	04/09/16	10/27/15	ACETONE, Lot 3032	-	L 0 8270/625LCS 80047		-	8 na/mL
S S S S S S S S S S	1				H	I		-	
Outobearene 8 8 8 8 8 8 8 8 8								Benzoic acid	8 ug/mL
10 to be prene								Indene	S normi.
								Athazine	S ng/ml.
10tobearene								Renna Jehrena	S mar/mt
10 to be barene								The second secon	
								The state of the state of	
100 100								1 5 4 E Montrelland Landbounces	
Contractive Contractive								1 o 4 me of celebrate	- 1
								1.2.4-11.Contobourene	
								I. J. Dichlorobenzene	
A sense de l'iterate d'iterate de l'iterate d'iterate de l'iterate d'iterate d'ite								1, 3-Dichlorobenzene	
A A A A A A A A A								1,3-Dinitrobenzene	
A								I, 4-Dichlorobenzene	
# ### ################################								I,4-Dioxane	
A A A A A A A A A								1-MethyInaphthalene	4 ng/mr
								2,2 -oxybis[1-chloropropane]	4 ng/mg
A A A A								2, 3, 4, 6-Tetrachlorophenol	4 ng/mr
Pophenol								2,4,5-Trichlorophenol	4 ng/mr
## control								2,4,6-Trichlorophenol	
### ##################################								2,4-Dichlorophenol	4 ng/mr
S S S S S S S S S S								2,4-Dimethylphenol	4 nd/mF
erne é erne d alene d								2,4-Dinitrophenol	8 ng/mr
A lerne 4 alene 4 alene 6 alene 6 4 alene 6 4								2,4-Dinitrotoluene	
alene 4 alene 4 alene 6 alene 6								2, 6-Dichlorophenol	
Jene 4								2,6-Dinitrotoluene	
a series de la constante de la								2-chloronaphthalene	4 Ng/mr
alene a								2-Chlorophenol	
								2-Methylnaphthalene	
								2-Methylphenol	
								2-Nitroaniline	4 nd/mL
								2-Ni Frontienol	4 vov/ml.

REAGENT TRACEABILITY SUMMARY

Jop No.: 480-89467-1 Lab Name: TestAmerica Buffalo

Date Date Date Date Date Date Date Date	Reagent ID 8270 List 1/S_00005 8270 List1/10_00004 8270 List1/11_00005 0_8270Megallix_00027	Added Added Smit Smit Smit Smit Smit Smit Smit Smit	Analyte n-Octadecare Naphthalete Nichobensene Nichobensene Nichobensene Pertachlorophenol Phenanthrene Phenol Phenol Phenol Phenol Phenol Phenol Phenol Phenol Phenol Phenol Phenol Phenol Phenol Phenol Autene Analyte Phenol Autene Phenol Phe	Concentration 4 mg/mL 4 mg/mL 4 mg/mL
04/09/16 10/09/15 ACETONE, Lot 2929878	100 mL 8270 List 1/S_00005 8270 List1/10_00004 8270 List1/11_00005 0_8270MegaMix_00027	2 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5		4 ug/ml 4 ug/ml
04/09/15 ACETONE, Lot 2929878	100 mL 8270 14st 1/S_00005 8270 11st1/10_00004 8270 11st1/11_00005 0_8270WegaMix_00027	다 다 다 다 다 다 다 다 다 다 다 다 다 다 다 다 다 다 다		Jm/bn \$
04/09/16 10/09/15 ACETONE, Lot 2929876	100 mL 8270 List 1/S_00005 8270 List1/10_00004 8270 List1/11_00005 0_8270MegaMix_00027	다 다 다 다 다 다 다 다 다 다 다 다 다 다 다 다 다 다 다		
04/09/15 ACETONE, Lot 2929878	100 mL 8270 List 1/S_00005 8270 List1/10_00004 8270 List1/11_00005 0_8270Megaisix_00027	7		
10/09/15 ACETONE, Lot 2929878	100 mL 8270 tAst 1/S_00005 8270 tist1/10_00004 8270 tist1/11_00005 0_8270WegaMix_00027	の も も も 日 日 日 日 日 日 日 日 日 日 日 日 日 日 日 日		8 novmb
04/09/16 10/09/15 ACETONE, Lot 2929976	100 mL 8270 List 1/S_00005 8270 List1/10_00004 8270 List1/11_00005 0_8270Megaüix_00027	2		4 ud/mL
04/09/16 10/09/15 ACETONE, Lot 2929878	100 mL 8270 LAST 1/S_00005 8270 LAST/10_00004 8270 LAST/11_00005 0_8270MegaWax_00027	2 2 2 E		4 ng/mg
04/09/16 10/09/15 ACETONE, Lot 2929876	100 mL 8270 List 1/S_00005 8270 List1/10_00004 8270 List1/11_00005 0_8270MegalSix_00027	2 2 2 E		July 4 Mg/mL
04/09/15 ACETONE, Lot 2929878	100 mL 8270 List 1/S_00005 8270 List1/10_00004 8270 List1/11_00005 0_8270MegaMix_00027	다 다 다 다 그 다 다 다		Jm/bn 4
8270 Lisel/10_00 8270 Lisel/11_00 0_8270MegaMix_01	8270 List1/10_00004 8270 List1/11_00005 0_8270Megaüix_00027	1	1 1 1 1	100 ug/mL
8270 LISTI/ID 0 8270 LISTI/IL 00 0_8270MedaMix_01	8270 11851/11_00005 0_8270MedaMix_00027			TOO NOVER
0_8270 11st1/11_00	8270 11551/11_00005 0_8270MegaWix_00027	1 1 1	_	190 ng/m
O_8270MegaMix_0	0_8270MegaMix_00027	u 0	_	100 ug/mt
D_8270MegaMix_00	O_8270Megaŭtx_00027	5 m.	Benzaldenvae	Too not
O_8270Megatfi.x_00	O_8270MegaMix_00027	日日日		100 ng/mL
D_B2/ONeggadax_O	O_82 (OMegadix_OB002)	E o	- 1	TOO INDI
			40	am/ga ng/ma
			1,1,4,5-15-18CHACHACLODERSERS	THE PER CO.
			1,2,4-Trichloidbenzene	SO UG/ML
			1,2-Dichlorobenzene	20 ug/mL
			1,3-Dichlorobenzene	50 ng/mL
			1,3-Dinitrobenzene	50 na/mr
			1.4-Dichlorobenzene	50 ug/mL
			1.4-filogane	50 ng/at.
			1-Wether Franchshallone	E.G. sorring
			a stephinghmenatene	ALL ALL CO
			z, z -oxynis (1-chloropiopane)	30 ug/m
			2, 3, 4, 6-Tetrachlorophenol	50 ug/mt
			2, 4, 5-Trichlorophenol	50 ug/mL
			2,4,6-Trichlorophenol	50 ng/mL
			2.4-Dichlerophenol	50 Act/mL
			2.4-Dimethylphenol	50 mg/mL
			7.4-Dinitrophenol	100 novmL
			2.4-Dinitrotoluene	50 ug/mL
			3 s-night and aromband	SO world.
			O Salimitrotalinana	FO working
			A Children and which a children	am Aba ou
			2 Cutoconaphroatene	Jac. 202 102
			e-curotophenon	100 mg/mi
			2 Method shows	70 / nn / nn / nn / nn / nn / nn / nn /
			Tomand Thumbur	an /ba be
			2-Natroansline	50 ug/mL
			2-Nitrophenol	50 ng/mL
			3-Methylphenol	50 wg/mL
			3-Nitroaniline	50 uc/mL
			4,6-Dinitro-2-methylphenol	100 hg/mL
			4-Bromonhervl phenyl ether	50 no/ml.
			4-Chlore-3-methylphenol	50 ng/mL
			4-Chloroaniling	50 waying
			d-Chlorophenyl phanyl ather	50 nor/ml.
			4-Methylphenol	50 ng/mL

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Jap No.: 480-89467-1	
: TestAmerica Buffalo	
Lab Name	

Job No.: 480-89467-1 Lab Name: TestAmerica Buffalo

SDG No.:

			Teacent	Parent Readent		
Reagent ID	EMp	Prep	Dilutant Final	Reagent ID Added	Analyte	Concentration
.8270 List 1/5 00005	01/27/17		Rester, Lot A0312567	(Furchased Reagent)	3,3'-Dichlorobenzidine	2000 ug/mL
					Benzidine	
8270 biet1/19 00004	08/37/16		Restek, Lot A0108988	(Furchased Reagent)	Bensolc adid	
					Indene	
8270 list/13 00005	08/31/16		Rester, Lot A0108989	(Purchased Reagent)	Atrazine	
					Benzaldehyde	
					Ceprolactam	2000 ng/mL
O. 8270MegaNix 00027	12/21/16		Restel, Lot A0111934	(Furchased Reagent)	1,1'-Bipheny1	1000 ug/mL
					1,2,4,5-Tetrachlorobenzene	1000 ng/mt
					1, 2, 4-Trichlorobenzene	1000 ug/mL
					1, 3-Dichlorobenzene	1880 ug/mL
					1,3-Dichlorobenzene	1000 ug/mt
					1, 3-Dinitrobenzene	1000 ug/mL
					1,4-Dichlorobensene	1000 ng/mL
					1,4-Dioxane	1000 ng/mr
					I-MethyInaphthalene	1000 ng/mF
					[2,2'-oxybis[1-dhloropropane]	1000 ug/mL
					2,3,4,6-Tetrachlorophenol	3000 ng/mL
					2,4,5-Trichlorophenol	1000 ug/mL
					2,4,6-Trichlerophenol	1000 ug/mL
					2,4-Dichlorophenol	1000 ua/mL
					2,4-Dimethylphenol	1000 ug/mL
					2,4-Dinitrophenol	2000 ng/mt
					2,4-Dinittotoluene	1000 Mg/mL
					2,6-Dichlorophenol	1000 ug/mL
					2,6-Dinitrotoluene	1000 ug/mr
					2-Chloronaphthalene	1000 ng/mL
					2-Chlorophenol	1000 ng/mF
					2-Methylnaphthalene	1000 Mg/mL
					2-Methylphenol	1000 ug/mL
					2-Nitroaniline	1000 ng/mL
					2-Nitrophenol	1000 ng/mr
					3-Methylphenol	1000 ng/mF
					3-Nitposnaline	1000 ug/mL
					4, 6-Dinitro-2-methylphenol	2000 ug/mL
					4-Bromophenyl phenyl ether	1000 ng/mr
					4-Chloro-3-methylphenol	1000 ug/mL
					4-chloroaniline	1000 ug/mL
					4-Chlorophenyl phenyl ether	1000 ug/mL
					4-Methylphenol	1000 ng/mL
					4-Nitboaniline	1000 wd/m
					4-Nitrophenol	2000 uq/mL
					Acenaphthene	1000 ug/mL
					Acenaphthylene	1000 ug/mL
					Acetophenone	1000 ng/mL
					Aniline	1000 ug/mt
					Anthracene	1000 ug/mL
					Azobenzene	1000 ng/mL

11/13/2015

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Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

Respent ID Date Date Date Date	Distant Distant Distant	Volume	Reagent ID	Volume Added	Analyte	
						Concentration
					Benzo[a]authracene	1000 ag/mL
					Benzo[a]pyrene	1000 ng/mr
					Benzo[b]fluoranthene	1000 ng/mL
					Benzo[g,h,i]perylene	1000 ng/mL
					Benzo[k]fluoranthene	1000 ug/mL
					Benzyl alcohol	
					Bis (3-chloroethoxy) methans	1000 Mg/mL
					Bis (2-chloroethyl) ether	
					Bis(2-ethylhexyl) phthalate	1000 ng/mt
					Buryl benzyl phthalate	1000 ug/mL
					Carbazole	1000 ug/mL
					Chrysene	1000 ug/mt
					Di-n-butyl phthalate	1000 ug/mL
					Di-n-octyl phthalate	1000 ng/mL
					Dibenz(a,h) anthracene	1000 ng/mL
					Dibenzofuran	
					Distrivi phthalate	1000 ug/mL
					Dimethyl phthalate	3000 uq/mL
					Diphenylamine	
					Fluoranthene	1000 ug/mL
					Fluorene	1000 ng/mL
					Hexachlorobenzene	1000 ug/mL
					Hexachlorobutadiene	1000 ng/mt
					Hexachlorocyclopentadiene	1000 Mg/mL
					Hexachloresthane	1000 ug/mL
					Hexadecane	1000 ug/mt
					Indeno[1, 2, 3-cd]pyrene	1000 ug/mL
					Isophorone	1000 ng/ml
					n-Decame	1000 ug/mL
					N-Nitrosodi-n-propylamine	1000 ug/mL
					N-Nitrosodinethylamine	2000 ng/mL
					N-Nitrosodiphenylamine	2000 ug/mL
					n-Octadecane	
					Naphthalene	TOOO nd/mr
					Nictobensere	1000 ng/mr
					Pentachlorophenol	Tw/bn nonz
					Phenanthrene	1000 ug/mL
					Phenol	1000 ug/mL
		1			Pyrene	TOOM AND THE
					FYL LULIDE	
O 8270LLsurr 00034 04/26/16 10/26/15 Wethanol, Lot 2976711	or 2976711	1000 mL 0 B	1000 mL O 82708utr st 00001	1.6 mL	2,4,6 - Tribromophenol	
					2.4.6-Trabromophenol	8 Ng/mr
					2-Fluorobiphenyl	8 ng/mF
					2-Sluorophenel	2m/57.8
					Nitrobenzene-dS (Surr)	8 ug/mT
					p-Terphenyl-dl4 (Surr)	8 ng/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica Buffalo Jop No.: 480-89467-1

SDG No.:

				Teachent	Patent Reagent	200		
Reagent ID	EXP	Prep	Dilutant	Final	Reagent ID	Volume	Analyte	Concentration
							Terohenyl-dl4	S ug/mt
O 82709MIT St 00001	02/28/18		Restek, Lot Ad93638		(Furchased Reagent)	(ent)	2,4,6 - Tribromophenol	5000 ng/mr
							2,4,6-Tribromophenol	5000 ug/mL
							2-Fluorobiphenyl	5000 ng/mt
							2-Fluorophenol	Tu/bn ppos
							Nitrobenzene-d5 (Surr)	5000 ng/mL
							p-Terphenyl-dl4 (Surr)	241/5% DOOS
							Phenol-d5	5000 ug/mL
							Terpheny1-dl4	5000 ng/mt
8270surr 00036	04/30/16	10/30/15	10/30/15 ACETONE, Lot 3032536	1000 mL	1000 mt o 8270sur sib 00004	10 mt	10 mt 2,4,6-Tribromophenol	40 ug/mL
					r		2-Fluorobiphenyl	40 ug/mL
							2-Finorophenel	40 ug/mL
							Mitrobenzene-d5 (Surr)	do ug/mL
							p-Terphenyl-d14 (Surr)	40 ug/mr
							Phenol-d5	40 ug/mL
O S270sur stk 00004	81/05/50		Ultra, Lot CM-4519		(Furnhased Reagent)	(ent)	2, 4, 6-Tribromophenol	4000 ug/mt.
							2-Fluorobiphenyl	Anno ag/mt
							2-Fluorophenel	4000 ug/mL
							Witrobenzene-d5 (Surr)	4000 ng/mr
							p-Terphenyl-dl# (Surr)	4000 ug/mL
							Phenol-d5	4000 ng/mL

Certification Summary

Client: U.S. Army Construction Engineering Resea Project/Site: Cerl Gasifier - Research Project

TestAmerica Job ID: 480-89467-1

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica Buffalo	California	State Program	9	1169CA
TestAmerica Buffalo	Connecticut	State Program	4	PH-0568
TestAmerica Buffalo	Florida	NELAP	4	E87672
TestAmerica Buffalo	Georgia	State Program	4	956
TestAmerica Buffalo	Georgia	State Program	4	N/A
TestAmerica Buffalo	Illinois	NELAP	5	200003
TestAmerica Buffalo	lowa	State Program	7	374
TestAmerica Buffalo	Kansas	NELAP	7	E-10187
TestAmerica Buffalo	Kentucky (DW)	State Program	4	90029
TestAmerica Buffalo	Kentucky (UST)	State Program	4	30
TestAmerica Buffalo	Kentucky (WW)	State Program	4	90029
TestAmerica Buffalo	Louisiana	NELAP	6	02031
TestAmerica Buffalo	Maine	State Program	1	NY00044
TestAmerica Buffalo	Maryland	State Program	3	294
TestAmerica Buffalo	Massachusetts	State Program	1	M-NY044
TestAmerica Buffalo	Michigan	State Program	5	9937
TestAmerica Buffalo	Minnesota	NELAP	5	036-999-337
TestAmerica Buffalo	New Hampshire	NELAP Primary AB	1	2973
TestAmerica Buffalo	New Hampshire	NELAP Secondary AB	1	2337
TestAmerica Buffalo	New Jersey	NELAP	2	NY455
TestAmerica Buffalo	New York	NELAP	2	10026
TestAmerica Buffalo	North Dakota	State Program	8	R-176
TestAmerica Buffalo	Oklahoma	State Program	6	9421
TestAmerica Buffalo	Oregon	NELAP	10	NY200003
TestAmerica Buffalo	Pennsylvania	NELAP	3	68-00281
TestAmerica Buffalo	Rhode Island	State Program	1	LAO00328
TestAmerica Buffalo	Tennessee	State Program	4	TN02970
TestAmerica Buffalo	Texas	NELAP	6	T104704412-15-
TestAmerica Buffalo	USDA	Federal		P330-11-00386
TestAmerica Buffalo	Virginia	NELAP	3	460185
TestAmerica Buffalo	Washington	State Program	10	C784
TestAmerica Buffalo	West Virginia DEP	State Program	3	252
TestAmerica Buffalo	Wisconsin	State Program	5	998310390

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.

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TestAmer Bea Buffalo

Method 8270D

Semivolatile Organic Compounds (GC/MS) by Method 8270D

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FORM II GC/MS SEMI VOA SURROGATE RECOVERY

Lab	Name:	TestAmerica Buffalo	Job No.:	480-89467-1	
SDG	No.:				

Matrix: Waste Level: Low

GC Column (1): PXI-5sil Ms ID: 0.25(mm)

Client Sample ID	Lab Sample ID	NEZ	#	FBF		TPH	é
08-01-031815-1530	480-89467-14	65	1	94	+	94	
OS-01-042415-1600	480-89467-15	88	1	102	7	101	
OS-01-042815-1600	480-89467-16	0	-20	83	7	81	
08-01-050715-1630	480-89467-17	94		97	-	103	
OS-01-101514-0910	480-89467-22	0	3	73		75	
	MB 480-273073/1-A	86	T	98	Ŧ	99	
	LCS 480-273073/2-A	79		93		102	
	LCSD 480-273073/3-A	82		93		96	

	QC LIMITS
NBZ = Nitrobenzene-d5 (Surr)	34-132
FBP = 2-Fluorobiphenyl	37-120
TPH = p-Terphenyl-d14 (Surr)	65-153

Column to be used to flag recovery values

FORM II 8270D

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FORM II GC/MS SEMI VOA SURROGATE REGOVERY

Lab	Name:	TestAmerica	Buffalo	Jøb No.:	480-89467-1

SDG No.:

Matrix: Water Level: Low

GC Column (1): RXI-5sil MS ID: 0.25(mm)

Client Sample ID	Lab Sample ID	NEZ	#	FBE	ū	TPH	Ó
WW-02-030515-1557	480-89467-2	152	х	101	+	76	
WW-01-030515-1352	480-89467-5	76	- 1	91	7	73.	
WW-01-042815-1600	480-89467-6	106		106	1	85	7
WW-01-042815-1600 DL	480-89467-6 DL	0	20	99	T	104	
WW-01-050715-1600	480-89467-8	0.	X	98		72	
WW-01-050715-1600 DL	480-89467-8 DL	0	X	87	1	76	
P-01-030515-1557	480-B9467-10	0	-8	81		67	
P-01-051315-1530	480-89467-13	0	X	95	T	83	
P-01-101514-0910	480-89467-18	0	M	93		74	
P-01-100814-1120	480-89467-19	0	.70	94	7	98	
P-01-013015-0915	480-89467-20	0	X	118	1	65.	12
B-01-013015-0915 DL	480-89467-20 DL	g	X	89	1	72	
	MB 480-273586/1-A	82		86		99	T
	LCS 480-273586/2-A	83		83		98	

	QC LIMITS
NBZ = Nitrobenzene-d5 (Surr)	46-120
FBP = 2-Fluorobiphenyl	48-120
TPH = p-Terphenyl-d14 (Surr)	67-150

Column to be used to flag recovery values

FORM II 8270D

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FORM III GC/MS SEMI VOA LAB CONTROL SAMPLE RECOVERY

Lab Name: TestAmerica Buffalo Job No.: 480-89467-1

SDG No.:

Matrix: Waste Level: Low Lab File ID: X009014106.D

Lab ID; DCS 480-273073/2-A Client ID:

COMPOUND	SPIKE ADDED (ug/Kg)	LCS CONCENTRATION (ug/Kg)	LCS: % REC	QC LIMITS REC	#
Acenaphthene	500000	460000	92	53-120	
Acenaphthylene	500000	453000	91	58-121	
Anthracene	500000	517000	103	62-129	
Benzo[a]anthracene	500000	502000	100	65-133	
Benzo[a]pyrene	500000	497000	99	64-127	
Benzo[b]fluoranthene	500000	488000	98	64-135	
Benzo[g,h,i]perylene	500000	508000	102	50-152	
Benzo[k]fluoranthene	500000	514000	103	58-138	
Chrysene	500000	492000	98	64-131	
Dibenz(a,h)anthracene	500000	506000	101	54-148	
Fluoranthene	500000	503000	101	62-131	-
Fluorene	5,00000	483000	97	63-126	
Indeno[1,2,3-cd]pyrene	500000	505000	101	56-149	
Naphthalene	500000	438000	88	46-120	
Phenanthrene	500000	518000	104	60-130	
Pyrene	500000	516000	103	51-133	

Column to be used to flag recovery and RPD values FORM III 8270D

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FORM III GC/MS SEMI VOA LAB CONTROL SAMPLE RECOVERY

Lab Name: TestAmerica Buffalo Job No.: 480-89467-1

SDG No.:

Matrix: Water Level: Low Lab File ID: V54276.D

Lab ID; LCS 480-273586/2-A Client ID:

COMPOUND	SPIKE ADDED (ug/L)	LCS CONCENTRATION (ug/L)	LCS. % REC	QC LIMITS REC	#
Acenaphthene	16.0	14.5	91	60-120	
Acenaphthylene	16.0	14.7	92	63-120	
Anthracene	16.0	14.8	92	58-148	
Benzo[a]anthracene	16.0	15.0	94	55-151	
Benzo[a]pyrene	16.0	14.5	90	60-145	
Benzo[b]fluoranthene	16.0	14.5	91	54-140	
Benzo[g,h,i]perylene	16,0	17.1	107	66-152	
Benzo[k]fluoranthene	16.0	14.4	90	51-153	
Chrysene	16.0	15.0	93	69-140	
Dibenz(a,h)anthracene	16.0	15.9	99	57-148	
Fluoranthene	16.0	15.4	96	55-147	
Fluorene	16.0	15.0	94	55-143	
Indeno[1,2,3-cd]pyrene	16.0	15.8	99	69-146	
Naphthalene	16.0	12.8	80	35-130	
Phenanthrene	16.0	14.9	93	57-147	
Pyrene	16.0	15.5	97	58-136	

Column to be used to flag recovery and RPD values FORM III 8270D

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FORM III GC/MS SEMI VOA LAB CONTROL SAMPLE DUPLICATE RECOVERY

Lab Name: TestAmerica Buffalo Job No.: 480-89467-1

SDG No.:

Matrix: Waste Level: Low Lab File ID: X009014107.D

Lab ID; LCSD 480-273073/3-A Client ID:

	SPIKE	LCSD CONCENTRATION	LCSD	*	QC LI	MITS	#
COMPOUND	(ug/Kg)	(ug/Kg)	REC	RPD	RPD	REC	tr
Acenaphthene	500000	455000	91	1	35	53-120	
Acenaphthylene	500000	452000	90	0	18	58-121	
Anthracene	500000	492000	98	5	15	62-129	
Benzo[a]anthracene	500000	469000	94	7	15	65-133	-
Benzo[a]pyrene	500000	471000	94	5	15	64-127	-
Benzo[b]fluoranthene	500000	466000	93	. 5	15	64-135	
Benzo[g,h,i]perylene	500000	482000	96	5	15	50-152	
Benzo[k]fluoranthene	500000	491000	98	- 5	22	58-138	
Chrysene	500000	467000	93	5	15	64-131	
Dibenz(a,h)anthracene	500000	481000	96	5	15	54-148	
Fluoranthene	500000	486000	97	3	15	62-131	
Fluorene	500000	469000	94	3	15	63-126	
Indeno[1,2,3-cd]pyrene	500000	474000	95	6	15	56-149	
Naphthalene	500000	428000	86	2	29	46-120	
Phenanthrene	500000	495000	99	5	15	60-130	
Pyrene	500000	478000	96	8	35	51-133	

Column to be used to flag recovery and RPD values FORM III 8270D

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FORM IV GC/MS SEMI VOA METHOD BLANK SUMMARY

Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1
SDG No.:	
Lab File ID: X009014105.D	Lab Sample ID: MB 480-273073/1-A
Matrix: Waste	Date Extracted: 11/04/2015 13:45
Instrument ID: HP5973X	Date Analyzed: 11/05/2015 15:13
Level: (Low/Med) Low	

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAE SAMPLE ID	LAB FILE ID	DATE ANAL	YZED
	LCS 480-273073/2-A	X009014106.	11/05/2015	15:40
	LCSD 480-273073/3-A	X009014107.	11/05/2015	16:07
OS-01-031815-1530	480-89467-14	X009014108.	11/05/2015	16:34
OS-01-042415-1600	480-89467-15	X009014109.	11/05/2015	17:01
OS-01-042815-1600	480-89467-16	X009014110.	11/05/2015	17:28
08-01-050715-1630	480-89467-17	X009014111.	11/05/2015	17:55
OS-01-101514-0910	480-89467-22	X009014112. D	11/05/2015	18:21

FORM IV 8270D

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FORM IV GC/MS SEMI VOA METHOD BLANK SUMMARY

Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1
SDG No.:	
Lab File ID: V54275.D	Lab Sample ID: MB 480-273586/1-A
Matrix: Water	Date Extracted: 11/06/2015 12:33
Instrument 1D: HP5973V	Date Analyzed: 11/09/2015 14:26
Level: (Low/Med) Tow	

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
WITH A PARTY OF THE PARTY OF TH	LCS 480-273586/2-A	V54276.D	11/09/2015 14:56
WW-02-030515-1557	480-89467-2	V60015.D	11/10/2015 17:23
WW-01-030515-1352	480-89467-5	V60016.D	11/10/2015 17:52
WW-01-042815-1600	480-89467-6	V60017.D	11/10/2015 18:21
WW+01-050715-1600	480-89467-8	V60018.D	11/10/2015 18:50
P-01-030515-1557	480-89467-10	V60019.D	11/10/2015 19:19
P-01-051315-1530	480-89467-13	V60020.D	11/10/2015 19:48
P-01-101514-0910	480-89467-18	V60021.D	11/10/2015 20:17
P-01-100814-1120	480-89467-19	V60022.D	11/10/2015 20:46
P-01-013015-0915	480-89467-20	V60023.D	11/10/2015 21:15
WW-01-042815-1600 DL	480-89467-6 DL	V60046.D	11/11/2015 13:47
WW-01-050715-1600 DL	480-89467-8 DL	V60047.D	11/11/2015 14:16
P-01-013015-0915 DL	480-89467-20 DL	V60048.D	11/11/2015 14:45

FORM IV 8270D

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Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1
SDG No.:	
Lab File ID: V53779.D	DFTPP Injection Date: 10/26/2015
Instrument ID: HP5973V	DFTPP Injection Time: 19:07
Analysis Batch No.: 271208	

M/E	ION ABUNDANCE CRITERIA		LATIVE DANCE
51	10-80% of Base Peak	47.1	
68	Less than 2% of mass 69	0.1	(0.3)1
69	Mass 69 Relative abundance	38.5	
70	Less than 2% of mass 69	0.2	(0.6)1
127	10-80% of Base Peak	50.8	
197	Less than 2% of mass 198	0.0	
198	Base peak	100.0	
199	5-9% of mass 198	6.8	
275	10-60% of Base Peak	29.9	
365	Greater than 1% of mass 198	4.4	_ ~ ~ ~ ~
441	present but less than 24% of mass 442	21.9	(15.0)2
442	Greater than 50% of mass 198	145.7	
443	15-24% of mass 442	29.3	(20.1)2

1-Value is % mass 69

29.3 (20.1 2-Value is % mass 442

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
	IC 480-271208/3	V53780.D	10/26/2015	19:36
	IC 480-271208/4	V53781.D	10/26/2015	20:05
	IC 480-271208/5	V53782.D	10/26/2015	20:35
	ICIS 480+271208/6	V53783.D	10/26/2015	21:04
	IC 480-271208/7	V53784.D	10/26/2015	21:33
	IC 480-271208/8	V53785.D	10/26/2015	22:02
	IC 480-271208/9	V53786.D	10/26/2015	22:31

Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1	
SDG No.:		
Lab File ID: V54271.D	DFTPP Injection Date: 11/09/2015	
Instrument ID: HP5973V	DFTPP Injection Time: 12:27	

M/E	ION ABUNDANCE CRITERIA		DANCE
51	10-80% of Base Peak	54.9	
68	Less than 2% of mass 69	8.0	(1.9)1
69	Mass 69 Relative abundance	41.4	
70	Less than 2% of mass 69	0.1	(0.3)1
127	10-80% of Base Peak	49.8	
197	Less than 2% of mass 198	0.0	
198	Base peak	100.0	
199	5-9% of mass 198	6.9	
275	10-60% of Base Peak	32.2	
365	Greater than 1% of mass 198	5.7	
441	present but less than 24% of mass 442	26.7	(15.2)2
442	Greater than 50% of mass 198	176.1	
443	15-24% of mass 442	34.3	(19.5)2

1-Value is % mass 69

Analysis Batch No.: 273910

2-Value is % mass 442

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZEI
	CCVIS 480-273910/3	V54272.D	11/09/2015	12:57
	MB 480-273586/1-A	V54275,D	11/09/2015	14:26
	LCS 460-273586/2-A	V54276, D	11/09/2015	14:56

Tab Name: TestAmerica Buffalo Job No.: 480-89467-1

Lab File ID: V60001.D DFTPP Injection Date: 11/10/2015

Instrument ID: HP5973V DFTPP Injection Time: 10:38

Analysis Batch No.: 273999

M/E	ION ABUNDANCE CRITERIA		LATIVE DANCE
51	10-80% of Base Peak	58.4	
68	Less than 2% of mass 69	0.2	(0.4)1
69	Mass 69 Relative abundance	44.4	
70	Less than 2% of mass 69	0.1	(0.3)1
127	10-80% of Base Peak	53.4	
197	Less than 2% of mass 198	0.0	
198	Base peak	100.0	
199	5-9% of mass 198	6.5	
275	10-60% of Base Peak	33.1	
365	Greater than 1% of mass 198	5.4	
441	present but less than 24% of mass 442	24.4	(15.0)2
442	Greater than 50% of mass 198	162.5	
443	15-24% of mass 442	31.6	(19.4)2

1-Value is % mass 69

2-Value is % mass 442

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
	CCVIS 480-273999/3	V60002.D	11/10/2015	11:07
WW-02-030515-1557	480-89467-2	V60015.D	11/10/2015	17:23
WW-01-030515-1352	480-89467-5	V60016,D	11/10/2015	17:52
WW-01-042815-1600	480-89467-6	V60017.D	11/10/2015	18:21
WW-01-050715-1600	480-89467-8	V60018.D	11/10/2015	18:50
P-01-030515-1557	480-89467-10	V60019.D	11/10/2015	19:19
P-01-051315-1530	480-89467-13	V60020,D	11/10/2015	19:48
P-01-101514-0910	480-89467-18	V60021.D	11/10/2015	20:17
P-01-100814-1120	480-89467-19	V60022.D	11/10/2015	20:46
P-01-013015-0915	480-89467-20	V60023.D	11/10/2015	21:15

Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1
SDG No.:	
Lab File ID: V60043.D	DFTPP Injection Date: 11/11/2015
Instrument ID: HP5973V	DFTPP Injection Time: 12:20
Analysis Batch No.: 274392	

M/E	ION ABUNDANCE CRITERIA		DANCE
51	10-80% of Base Peak	60.4	
68	Less than 2% of mass 69	0.0	(0.0)1
69	Mass 69 Relative abundance	47.7	
70	Less than 2% of mass 69	0.4	(0.9)1
127	10-80% of Base Peak	54.1	
197	Less than 2% of mass 198	0.4	
198	Base peak	100.0	
199	5-9% of mass 198	6.3	
275	10-60% of Base Peak	30.3	
365	Greater than 1% of mass 198	5.6	
441	present but less than 24% of mass 442	23.1	(15.6)2
442	Greater than 50% of mass 198	148.1	
443	15-24% of mass 442	30.0	(20.3)2

1-Value is % mass 69

2-Value is % mass 442

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
	CCVIS 480-274392/3	V60044.D	11/11/2015	12:49
WW-01-042815-1600 DL	480-89467-6 DL	V60046.D	11/11/2015	13:47
WW-01-050715-1600 DL	480-89467-8 DL	V60047.D	11/11/2015	14;16
P-01-013015-0915 DL	480-89467-20 DL	V60048.D	11/11/2015	14:45

Lab Name:	TestAmerica Buffalo	Job No.: 480-89467-1	
SDG No.:			
Lab File	ID: X009013898.D	DFTPF Injection Date: 10/23/2	015
Instrumen	L ID: HP5973X	DFTPP Injection Time: 08:06	

Analysis Batch No.: 270613

M/E	ION ABUNDANCE CRITERIA		LATIVE DANCE
51	10-80% of Base Peak	39.9	
68	Less than 2% of mass 69	0.0	(0.0)1
69	Mass 69 Relative abundance	38.7	
70	Less than 2% of mass 69	0.1	(0.3)1
127	10-80% of Base Peak	47.6	
197	Less than 2% of mass 198	0.0	
198	Base peak	100.0	
199	5-9% of mass 198	6.6	
275	10-60% of Base Peak	24.2	
365	Greater than 1% of mass 198	3.1	
441	present but less than 24% of mass 442	11.3	(15.1)2
442	Greater than 50% of mass 198	74.7	
443	15-24% of mass 442	15.1	(20.2)2

1-Value is % mass 69

2-Value is % mass 442

CLIENT SAMPLE ID	LAB SAMPLE ID	FILE ID	DATE ANALYZED	TIME ANALYZEI
	IC 480-270613/3	X009013899.D	10/23/2015	08:33
	IC 480-270613/4	X009013900.D	10/23/2015	09:00
	ICIS 480-270613/5	X009013901.D	10/23/2015	09:27
	IC 480+270613/6	X009013902.D	10/23/2015	09:54
	IC 480-270613/7	X009013903.D	10/23/2015	10:21
	IC 480-270613/8	X009013904.D	10/23/2015	10:48

Lab Name:	TestAmerica Buffalo	Job No.: 480-89467-1	
SDG No.:			
Lab File	ID: X009014094.D	DFTPP Injection Date:	11/05/2015
Instrumen	L ID: HP5973%	DFTPP Injection Time:	10:14
Analysis	Batch No.: 273506		

M/E	ION ABUNDANCE CRITERIA	<pre>% RELATIVE ABUNDANCE</pre>		
51	10-80% of Base Peak	35.8		
68	Less than 2% of mass 69	0.0	(0.0)1	
69	Mass 69 Relative abundance	38.1		
70	Less than 2% of mass 69	0.1	(0.2)1	
127	10-80% of Base Peak	48.6		
197	Less than 2% of mass 198	0.3		
198	Base peak	100.0		
199	5-9% of mass 198	7.3		
275	10-60% of Base Peak	26.9		
365	Greater than 1% of mass 198	2.6		
441	present but less than 24% of mass 442	13.4	(15.9)2	
442	Greater than 50% of mass 198	84.2		
443	15-24% of mass 442	16.0	(19.0)2	

1-Value is % mass 69

2-Value is % mass 442

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
	CCVIS 480-273506/3	X009014095.D	11/05/2015	10:42
	MB 480-273073/1-A	X009014105.D	11/05/2015	15:13
	LCS 480-273073/2-A	X009014106.D	11/05/2015	15:40
	LCSD 480-273073/3-A	X009014107.D	11/05/2015	16:07
OS-01-031815-1530	480-89467-14	X009014108.D	11/05/2015	16:34
OS-01-042415-1600	480-89467-15	X009014109.D	11/05/2015	17:01
OS-01-042815-1600	480-89467-16	X009014110.D	11/05/2015	17:28
OS-01-050715-1630	480-89467-17	X009014111.D	11/05/2015	17:55
OS-01-101514-0910	480-89467-22	X009014112.D	11/05/2015	18:21

Lab Name: TestAmerica Buffalo

SDG No.:

Sample No.: ICIS 480-271208/6

Date Analyzed: 10/26/2015 21:04

Instrument ID: HP5973V

GC Column: RXI-5Sil MS

ID: 0.25(mm)

Heated Purge: (Y/N) N

Calibration ID: 25393

		DCB		NPT		ANT	
		AREA 0	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION M	ID-POINT	149442	6.91	570099	7.99	309653	9.49
UPPER LIMIT		298884	7.41	1140198	8.49	619306	9.99
LOWER LIMIT		74721	6.41	285050	7.49	154827	8.99
LAE SAMPLE ID	CLIENT SAMPLE ID						
CCVIS 480-273910/3		95271	6.84	329442	7.93	188477	9.42
CCVIS 480-273999/3		93344	6.84	341975	7.93	195367	9.42
OCVIS 480-274392/3		119802	6.83	433077	7.91	241390	9.41

DCE = 1,4-Dichlorobenzene-d4

NPT = Naphthalene-d8

ANT = Acenaphthene-d10

Area Limit = 50%-200% of internal standard area RT Limit = \pm 0.5 minutes of internal standard RT

Column used to flag values outside QC limits

FORM VIII 8270D

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Lab Name: TestAmerica Buffalo

SDG No.:

Sample No.: ICIS 480-271208/6

Date Analyzed: 10/26/2015 21:04

Instrument ID: HP5973V

Calibration ID: 25393

Job No.: 480-89467-1

Date Analyzed: 10/26/2015 21:04

Date Analyzed: 10/26/2015 21:04

Heated Purge: (Y/N) N

Calibration ID: 25393

		PHN		CRY		PRY	
		AREA 0	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION M	ID-POINT	529481	10.76	529691	13.71	568302	16.09
UPPER LIMIT		1058962	11.26	1059382	14.21	1136604	16.59
LOWER LIMIT		264741	10.26	254846	13.21	284151	15.59
LAB SAMPLE ID	CLIENT SAMPLE ID						
CCVIS 480-273910/3		341,426	10.69	355683	13.60	404913	15.95
CCVIS 480-273999/3		351985	10.69	378577	13.60	408130	15.96
OCVIS 480-274392/3		432245	10.68	455083	13.59	514291	15.94

PHN = Phenanthrene-dl0

CRY = Chrysene-d12

PRY = Perylene-d12

Area Limit = 50%-200% of internal standard area RT Limit = \pm 0.5 minutes of internal standard RT

Column used to flag values outside QC limits

FORM VIII 8270D

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Lab Name: TestAmerica Buffalo

SDG No.:

Sample No.: CCVIS 480-273910/3

Date Analyzed: 11/09/2015 12:57

Instrument ID: HP5973V

Column: RXI-5Sil MS

ID: 0.25(mm)

Heated Purge: (Y/N) N

Calibration ID: 25512

		DCB		NPT		ANT	
		AREA 0	RT #	AREA #	RT #	AREA #	RT
12/24 HOUR STD		95271	6.84	329442	7.93	188477	9.42
UPPER LIMIT		190542	7.34	658884	8.43	376954	9.92
LOWER LIMIT		47636	6.34	164721	7.43	94239	3.92
LAE SAMPLE ID	CLIENT SAMPLE ID						
MB 480-273586/1-A		102514	6.84	376927	7.93	196758	9.42
LCS 480-273586/2-A		90277	6.85	309625	7.93	184829	9.42

DCE = 1,4-Dichlorobenzene-d4

NPT = Naphthalene-d8

ANT = Acenaphthene-d10

Area Limit = 50%-200% of internal standard area RT Limit = \pm 0.5 minutes of internal standard RT

Column used to flag values outside QC limits

FORM VIII 8270D

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Lab Name: TestAmerica Buffalo Job No.: 480-89467-1

SDG No.:

Sample No.: CCVIS 480-273910/3 Date Analyzed: 11/09/2015 12:57

Instrument ID: HP5973V GC Column: RXI-5Sil MS ID: 0.25(mm)

Lab File ID (Standard): V54272.D Heated Purge: (Y/N) N

Calibration ID: 25512

		PHN		CRY		PRY	
		AREA 0	BT #	AREA #	RT #	AREA #	RT (
12/24 HOUR STD		341426	10.69	355683	13,60	404913	15.95
UPPER LIMIT		682852	11.19	711366	14.10	809826	16.45
LOWER LIMIT		170713	10.19	177842	13.10	202457	15.45
LAE SAMPLE ID	CLIENT SAMPLE ID						
MB 480-273586/1-A		362667	10.69	352629	13.60	398914	15.95
LCS 480-273586/2-A		331204	10.69	334690	13.60	382997	15.95

PHN = Phenanthrene-dl0

CRY = Chrysene-d12

PRY = Perylene-d12

Area Limit = 50%-200% of internal standard area RT Limit = \pm 0.5 minutes of internal standard RT

Column used to flag values outside QC limits

FORM VIII 8270D

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Lab Name: TestAmerica Buffalo

SDG No.:

Sample No.: CCVIS 480-273999/3

Date Analyzed: 11/10/2015 11:07

Instrument ID: HP5973V

GC Column: RXI-5Sil MS

ID: 0.25(mm)

Heated Purge: (Y/N) N

Calibration ID: 25512

		DCE		NPT		ANT	
		AREA 0	RT #	AREA #	RT #	AREA #	RT (
12/24 HOUR STD		93344	6.84	341975	7.93	195367	9.42
UPPER LIMIT		186688	7.34	683950	8.43	390734	9.92
LOWER LIMIT		46672	6.34	170988	7.43	97684	8.92
LAE SAMPLE ID	CLIENT SAMPLE ID	i i					
480-89467-2	WW-02-030515-1557	67835	6.84	198714	7.93	138050	9.42
480-89467-5	WW-01-030515-1352	63659	6.84	232589	7.93	117556	9.42
480-89467-6	WW-01-042815-1600	66998	6.84	262688	7.93	138840	9.42
480-89467-8	WW-01-050715-1600	66266	6.84	228704	7.93	118105	9.42
480-89467-10	P-01-030515-1557	58403	6.84	201130	7.93	119172	9.42
480-89467-13	P-01-051315-1530	62927	6.84	171577	7.93	106344	9:42
480-89467-18	P-01-101514-0910	68965	6.34	265411	7.93	144724	9.42
480-89467-19	P-01-100814-1120	69294	6,84	263891	7.93	143234	9.42
480-89467-20	P-01-013015-0915	66386	6.84	283096	7.93	126756	9.42

DCE = 1,4-Dichlorobenzene-d4

NPT = Naphthalene-d8

ANT = Acenaphthene-d10

Area Limit = 50%-200% of internal standard area RT Limit = \pm 0.5 minutes of internal standard RT

Column used to flag values outside QC limits

FORM VIII 8270D

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Lab Name: TestAmerica Buffalo

SDG No.:

Sample No.: CCVIS 480-273999/3

Date Analyzed: 11/10/2015 11:07

Instrument ID: HP5973V

GC Column: RXI-5Sil MS

ID: 0.25(mm)

Heated Purge: (Y/N) N

Calibration ID: 25512

		PHN		CRY		PRY	
		AREA #	RT #	AREA #	RT #	AREA #	RT (
12/24 HOUR STD		351.985	10.69	378577	13.60	408130	15.96
UPPER LIMIT		703970	11.19	757154	14.10	816260	16.46
LOWER LIMIT		175993	10.19	189289	13.10	204065	15.46
LAE SAMPLE ID	CLIENT SAMPLE ID						
480-89467-2	WW-02-030515-1557	212495	10.69	219345	13.59	249628	15.95
480-89467-5	WW-01-030515-1352	231232	10.69	235769	13.59	279373	15.95
480-89467-6	WW-01-042815-1600	217134	10.69	224964	13.59	269946	15.95
480-89467-8	WW-01-050715-1600	211369	10.69	224229	13.59	257928	15.95
480-89467-10	P-01-030515-1557	264798	10.69	273051	13.59	241148	15.95
480-89467-13	P-01-051315-1530	200064	10.69	210839	13.59	237649	15.95
480-89467-18	P-01-101514-0910	252292	10.69	214554	13.59	252800	15.95
480-89467-19	P-01-100814-1120	261845	10.69	207719	13.59	243850	15,95
480-89467-20	P-01-013015-0915	189600	10.69	201516	13.60	227966	15.95

PHN = Phenanthrene-dl0

CRY = Chrysene-d12

PRY = Perylene-d12

Area Limit = 50%-200% of internal standard area RT Limit = \pm 0.5 minutes of internal standard RT

Column used to flag values outside QC limits

FORM VIII 8270D

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Lab Name: TestAmerica Buffalo

SDG No.:

Sample No.: CCVIS 480-274392/3

Date Analyzed: 11/11/2015 12:49

Instrument ID: HP5973V

Calibration ID: 25512

Job No.: 480-89467-1

Date Analyzed: 11/11/2015 12:49

GC Column: RXI-5Sil MS

ID: 0.25(mm)

Heated Purge: (Y/N) N

		DCB		NPT		ANT	
		AREA 0	RT #	AREA #	RT #	AREA #	RT #
12/24 HOUR STD		119802	6.83	433077	7.91	241390	9.41
UPPER LIMIT		239604	7.33	866154	8.41	482780	9.91
LOWER LIMIT		59901	6.33	216539	7.41	120695	8.91
LAE SAMPLE ID	CLIENT SAMPLE ID						
480-89467-6 DL	WW-01-042815-1600 DL	103932	6.83	389223	7.91	214727	9.41
480-89467-8 DL	WW-01-050715-1600 DL	98085	6.83	386503	7.91	212212	9.41
480-89467-20 DL	F-01-013015-0915 DL	106083	6.83	404412	7.91	219086	9.41

DCE = 1,4-Dichlorobenzene-d4

NPT = Naphthalene-d8

ANT = Acenaphthene-d10

Area Limit = 50%-200% of internal standard area RT Limit = \pm 0.5 minutes of internal standard RT

Column used to flag values outside QC limits

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Lab Name: TestAmerica Buffalo Job No.: 480-89467-1

SDG No.:

Sample No.: CCVIS 480-274392/3 Date Analyzed: 11/11/2015 12:49

Instrument ID: HP5973V GC Column: RXI-5Sil MS ID: 0.25(mm)

Lab File ID (Standard): V60044.D Heated Purge: (Y/N) N

Calibration ID: 25512

		PHN		CRY		PRY	
		AREA 0	RT #	AREA #	RT #	AREA #	RT 0
12/24 HOUR STD		432245	10.68	455083	13.59	514291	15.94
UPPER LIMIT		864490	11.18	910166	14.09	1028582	16.44
LOWER LIMIT		216123	10.18	227542	13.09	257146	15.44
LAE SAMPLE ID	CLIENT SAMPLE ID						
480-89467-6 DL	WW-01-042815-1600 DL	391748	10.68	356754	13.58	406441	15.94
480-89467-8 DL	WW-01-050715-1600 DL	357711	10.68	400746	13.58	449730	15.94
480-89467-20 DL	F-01-013015-0915 DL	393977	10.68	393209	13.58	388570	15.94

PHN = Phenanthrene-dl0

CRY = Chrysene-d12

PRY = Perylene-d12

Area Limit = 50%-200% of internal standard area RT Limit = \pm 0.5 minutes of internal standard RT

Column used to flag values outside QC limits

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Lab Name: TestAmerica Buffalo

SDG No.:

Sample No.: ICIS 480-270613/5

Date Analyzed: 10/23/2015 09:27

Instrument ID: HP5973X

GC Column: RXI-5Sil MS

ID: 0.25(mm)

Heated Purge: (Y/N) N

Calibration ID: 25373

		DCE		NPT		ANT	
		AREA 0	RT #	AREA #	RT #	AREA #	RT #
INITIAL CALIBRATION M	ID-POINT	424857	6.75	1528120	8.29	835898	10.38
UPPER LIMIT		849714	7.25	3056240	8.79	1671796	10.88
LOWER LIMIT		212429	6,25	754060	7.79	417949	9.88
LAE SAMPLE ID	CLIENT SAMPLE ID						
CCVIS 480-273506/3		490767	6.83	1759373	8.35	944559	10.42

DCE = 1,4-Dichlorobenzene-d4

NPT = Naphthalene-d8

ANT = Acenaphthene-d10

Area Limit = 50%-200% of internal standard area RT Limit = \pm 0.5 minutes of internal standard RT

Column used to flag values outside QC limits

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Lab Name: TestAmerica Buffalo

SDG No.:

Sample No.: ICIS 480-270613/5

Date Analyzed: 10/23/2015 09:27

Instrument ID: HP5973X

GC Column: RXI-5Sil MS

ID: 0.25(mm)

Heated Purge: (Y/N) N

Calibration ID: 25373

		PHN		CRY		PRY	
		AREA 0	BT #	AREA #	RT #	AREA #	RT (
INITIAL CALIBRATION M	ID-POINT	1333564	11.90	1449085	14.30	1412179	15.85
UPPER LIMIT		2667128	12.40	2898170	14.80	2824358	16.35
LOWER LIMIT		666782	11.40	724543	13.80	706090	15.35
LAE SAMPLE ID	CLIENT SAMPLE ID						
CCVIS 480-273506/3		1453807	11.94	1556266	14.34	1527454	15.91

PHN = Phenanthrene-dl0

CRY = Chrysene-d12

PRY = Perylene-d12

Area Limit = 50%-200% of internal standard area RT Limit = \pm 0.5 minutes of internal standard RT

Column used to flag values outside QC limits

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Lab Name: TestAmerica Buffalo

SDG No.:

Sample No.: CCVIS 480-273506/3

Date Analyzed: 11/05/2015 10:42

Instrument ID: HP5973X

GC Column: RXI-5sil MS

ID: 0.25(mm)

Heated Purge: (Y/N) N

Calibration ID: 25463

		DCB		NPT		ANT	
		AREA 0	RT #	AREA #	RT #	AREA #	R/T (
12/24 HOUR STD		490767	6.83	1759373	6.35	944559	10.42
UPPER LIMIT		981534	7.33	3518746	8.85	1889118	10.92
LOWER LIMIT		245384	6.33	879687	7.85	472280	9.92
LAE SAMPLE ID	CLIENT SAMPLE ID	Ì					
MB 480-273073/1-A		483013	6.83	1807441	8.35	973874	10.42
LCS 480-273073/2-A		417834	6.83	1510910	8.35	835337	10.42
LCSD 480-273073/3-A		451521	6.83	1633837	8.35	881871	10.42
480-89467-14	OS-01-031815-1530	385044	6,83	1415167	8.35	764597	10.42
480-89467-15	OS-01-042415-1600	355867	6.82	1295102	8.35	704107	10.42
480-89467-16	08-01-042815-1600	393020	6.83	1443122	8.35	804100	10.42
480-89467-17	05-01-050715-1630	428352	6.83	1553680	8.35	826628	10.41
480-89467-22	OS-01-101514-0910	387991	6,83	1402278	8.35	757710	10.42

DCE = 1,4-Dichlorobenzene-d4

NPT = Naphthalene-d8

ANT = Acenaphthene-d10

Area Limit = 50%-200% of internal standard area RT Limit = \pm 0.5 minutes of internal standard RT

Column used to flag values outside QC limits

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Lab Name: TestAmerica Buffalo Job No.: 480-89467-1

SDG No.:

Sample No.: CCVIS 480-273506/3 Date Analyzed: 11/05/2015 10:42

Instrument ID: HP5973X GC Column: RXI-5Sil MS ID: 0.25(mm)

Lab File ID (Standard): X009014095.D Heated Purge: (Y/N) N

Calibration ID: 25463

		PHN		CRY		PRY	
		AREA 0	RT #	AREA #	RT #	AREA #	R/T (
12/24 HOUR STD		1453807	11.94	1556266	14.34	1527454	15.91
UPPER LIMIT		2907614	12.44	3112532	14.84	3054908	16.41
LOWER LIMIT		726904	11.44	778133	13.84	763727	15.41
LAE SAMPLE ID	CLIENT SAMPLE ID						
MB 480-273073/1-A		1460083	11.94	1454885	14.93	1397926	15.91
LCS 480-273073/2-A		1348050	11.94	1395791	14.34	1348683	15.91
LCSD 480-273073/3-A		1422851	11.94	1521934	14.34	1448479	15.91
480-89467-14	OS-01-031815-1530	1237156	11.94	1365371	14.33	1358690	15.90
480-89467-15	OS-01-042415-1600	1132128	11.94	1193478	14.34	1195008	15.91
480-89467-16	08-01-042815-1600	1303747	11.94	1363959	14.33	1363965	15.91
480-89467-17	08-01-050715-1630	1336982	11.94	1424420	14.33	1371149	15.90
480-89467-22	OS-01-101514-0910	1215806	11,94	1307001	14.33	1299277	15,91

PHN - Phenanthrene-dl0

CRY = Chrysene-d12

PRY = Perylene-d12

Area Limit = 50%-200% of internal standard area RT Limit = \pm 0.5 minutes of internal standard RT

Column used to flag values outside QC limits

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FORM T CC/MS SEMI VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1
SDG No.:	
Client Sample ID: WW-02-030515-1557	Lab Sample ID: 480-89467-2
Matrix: Water	Lab File ID: V60015.D
Analysis Method: 8270D	Date Collected: 03/05/2015 15:57
Extract, Method: 35100	Date Extracted: 11/06/2015 12:33
Sample Wt/vol: 258(mL)	Date Analyzed: 11/10/2015 17:23
Con. Extract Vol.: 1(mL)	Dilution Factor: 20
Injection Volume: 2(uL)	Level: (low/med) Low
% Moisture:	GPC Cleanup; (Y/N) N
Analysis Batch No.: 273999	Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
83-32-9	Acenaphthene	ND	H	97	7.9
208-96-8	Acenaphthylene	ND	H	97	7.4
120-12-7	Anthracene	ND	H	97	5.4
56-55-3	Benzo[a]anthracene	ND	H	97	7.0
50-32-8	Benzo[a]pyrene	ND	H	97	9.1
205-99-2	Benzo[b] fluoranthene	ND	H	97	6.6
191-24-2	Benzolg, h, ilperylene	NĐ	H	97	6.8
207-08-9	Benzo[k]fluoranthene	ND	Н	97	14
218-01-9	Chrysene	ND	H	97	6.4
53-70-3	Dibenz (a,h) anthracene	ND	H	97	8.1
206-44-0	Fluoranthene	ND	H	97	7.8
86-73-7	Fluorene	ND	H	97	7.0
193-39-5	Indeno[1,2,3-cd]pyrene	ND.	Н	97	9.1
91-20-3	Naphthalene	34	JH	97	15
85-01-8	Phenanthrene	ND	H	97	8.5
129-00-0	Pyrene	ND	Н	97	6.6

CAS NO.	SURROGATE	% REC	Q	LIMITS
321-60-8	2-Fluorobiphenyl	101		48-120
4165-60-0	Nitrobenzene-d5 (Surr)	152	X	46-120
1718-51-0	p-Terphenyl-d14 (Surr)	76		67-150

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Job No.: 480-89467-1
Lab Sample ID: 480-89467-5
Lab File ID: V60016.D
Date Collected: 03/05/2015 13:52
Date Extracted: 11/06/2015 12:33
Date Analyzed: 11/10/2015 17:52
Dilution Factor: 20
Level: (low/med) Low
GPC Cleanup; (Y/N) N
Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
83-32-9	Acenaphthene	ND	н	97	7.9
208-96-8	Acenaphthylene	ND	H	97	7.3
120-12-7	Anthracene	ND	H	97	5.4
56-55-3	Benzo[a]anthracene	ND	H	97	7.0
50-32-8	Benzo[a]pyrene	ND	H	97	9.1
205-99-2	Benzo[b] fluoranthene	ND	H	97	6.6
191-24-2	Benzolg,h,i]perylene	ND	H	97	6.8
207-08-9	Benzo[k]fluoranthene	ND	Н	97	14
218-01-9	Chrysene	ND	H	97	6.4
53-70-3	Dibenz (a,h) anthracene	ND	H	97	8.1
206-44-0	Fluoranthene	ND	H	97	7.7
86-73-7	Fluorene	ND	H	97	7.0
193-39-5	Indeno[1,2,3-cd]pyrene	ND	H	97	9.1
91-20-3	Naphthalene	15	JH	97	15
85-01-8	Phenanthrene	ND	H	97	8.5
129-00-0	Pyrene	ND	н	917	6.6

CAS NO.	SURROGATE	%REC	Q	LIMITS
321-60-8	2-Fluorobiphenyl	91		48-120
4165-60-0	Nitrobenzene-d5 (Surr)	76		46-120
1718-51-0	p-Terphenyl-d14 (Surr)	73		67-150

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Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1
SDG No.:	
Client Sample ID: WW-01-042815-1600	Lab Sample ID: 480-89467-6
Matrix; Water	Lab File ID: V60017.D
Analysis Method: 8270D	Date Collected: 04/28/2015 16:00
Extract, Method: 3510C	Date Extracted: 11/05/2015 12:33
Sample Wt/vol: 259.7(mL)	Date Analyzed: 11/10/2015 18:21
Con. Extract Vol.: 1(mL)	Dilution Factor: 20
Injection Volume: 2(uL)	Level: (low/med) Low
% Moisture:	GPC Cleanup; (Y/N) N
Analysis Batch No.: 273999	Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
83-32-9	Acenaphthene	30	JH	96	7.9
208-96-8	Acenaphthylene	130	H	96	7.3
120-12-7	Anthracene	7.4	JH	96	5.4
56-55-3	Benzo[a]anthracene	ND	H	96	6.9
50-32-8	Benzo[a]pyrene	ND	H	96	9.0
205-99-2	Benzo[b]fluoranthene	ND	H	96	6.5
191-24-2	Benzo[g,h,i]perylene	NĐ	H	9.6	6.7
207-08-9	Benzo[k]fluoranthene	ND	Н	96	14
218-01-9	Chrysene	ND	H	96	6.4
53-70-3	Dibenz (a, h) anthracene	ND	H	96	8.1
206-44-0	Fluoranthene	ND	H	96	7.7
86-73-7	Fluorene	26	JH	96	6.9
193-39-5	Indeno[1,2,3-cd]pyrene	ND.	Н	96	9.0
91-20-3	Naphthalene	1500	EH	96	15
85-01-8	Phenanthrene	24	JH	96	8.5
129-00-0	Pyrene	ND	Н	96	6.5

CAS NO.	SURROGATE	%REC	Q	LIMITS
321-60-8	2-Fluorobiphenyl	106		48-120
4165-60-0	Nitrobenzene-d5 (Surr)	106		46-120
1718-51-0	p-Terphenyl d14 (Surr)	85		67-150

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Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1
SDG No.:	
Client Sample ID: WW-01-042815-1600 DL	Lab Sample ID: 480-89467-6 DL
Matrix: Water	Lab File ID: V60046.D
Analysis Method: 8270D	Date Collected: 04/28/2015 16:00
Extract, Method: 3510C	Date Extracted: 11/06/2015 12:33
Sample wt/vol: 259.7(mL)	Date Analyzed: 11/11/2015 13:47
Con. Extract Vol.: 1(mL)	Dilution Factor: 100
Injection Volume: 2(uL)	Level: (low/med) Low
% Moisture:	GPC Cleanup; (Y/N) N
Analysis Batch No.: 274392	Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
83-32-9	Acenaphthene	41	J H	480	39
208-96-8	Acenaphthylene	140	JH	480	37
120-12-7	Anthracene	.ND	Ħ	480	27
56-55-3	Benzo[a]anthracene	ND	H	480	35
50-32-8	Benzo[a]pyrene	ND.	H	480	45
205-99-2	Benzo[b]fluoranthene	ND	H	480	33
191-24-2	Benzo(q,h,ilperylene	ND	H	480	34
207-08-9	Benzo[k]fluoranthene	ND.	10	480	70
218-01-9	Chrysene	.ND	H	480	32
53-70-3	Dibenz (a,h) anthracene	.ND	H	480	40
206-44-0	Fluoranthene	ND	H	480	39
86-73-7	Fluorene	ND	H	480	35
193-39-5	Indeno[1,2,3-cd]pyrene	ND.	10	480	45
91-20-3	Naphthalene	1700	H	480	7.3
85-01-8	Phenanthrene	ND	H	480	42
129-00-0	Pyrene	ND.	H	480	33

CAS NO.	SURROGATE	%REC	Q	LIMITS
321-60-8	2-Fluorobiphenyl	99		48-120
4165-60-0	Nitrobenzene-d5 (Surr)	0	X.	46-120
1718-51-0	p-Terphenyl d14 (Surr)	104		67-150

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Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1
SDG No.:	
Client Sample ID: WW-01-050715-1600	Lab Sample ID: 480-89467-8
Matrix: Water	Lab File ID: V60018.D
Analysis Method: 8270D	Date Collected: 05/07/2015 16:00
Extract, Method: 3510C	Date Extracted: 11/05/2015 12:33
Sample Wt/vol: 259.1(mL)	Date Analyzed: 11/10/2015 18:50
Con. Extract Vol.: 1(mL)	Dilution Factor: 20
Injection Volume: 2(uL)	Level: (low/med) Low
% Moisture:	GPC Cleanup: (Y/N) N
Analysis Batch No.: 273999	Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
83-32-9	Acenaphthene	64	JH	96	7.9
208-96-8	Acenaphthylene	210	H	96	7.3
120-12-7	Anthracene	15	JH	96	5.4
56-55-3	Benzo[a]anthracene	ND	H	96	6.9
50-32-8	Benzo[a]pyrene	NI	H	96	9.1
205-99-2	Benzo[b]fluoranthene	ND	H	96	6.6
191-24-2	Benzolg,h,i]perylene	ND	H	96	6.8
207-08-9	Benzo[k]fluoranthene	ND	Н	96	14
218-01-9	Chrysene	ND	H	96	6.4
53-70-3	Dibenz (a, h) anthracene	ND	H	96	8.1
206-44-0	Fluoranthene	ND	H	96	7.7
86-73-7	Fluorene	48	JH	96	6.9
193-39-5	Indeno[1,2,3-cd]pyrene	ND.	Н	96	9.1
91-20-3	Naphthalene	1700	EH	96	15
85-01-8	Phenanthrene	51	JH	96	8.5
129-00-0	Pyrene	ND	Н	96	6.6

CAS NO.	SURROGATE	% REC	Q	LIMITS
321-60-8	2-Fluorobiphenyl	98		48-120
4165-60-0	Nitrobenzene-d5 (Surr)	0	X	46-120
1718-51-0	p-Terphenyl d14 (Surr)	72		67-150

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Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1
SDG No.:	
Client Sample ID: WW-01-050715-1600 DL	Lab Sample ID: 480-89467-8 DL
Matrix; Water	Lab File ID: V60047.D
Analysis Method: 8270D	Date Collected: 05/07/2015 16:00
Extract, Method: 3510C	Date Extracted: 11/05/2015 12:33
Sample wt/vol: 259.1(mL)	Date Analyzed: 11/11/2015 14:16
Con. Extract Vol.: 1(mL)	Dilution Factor: 100
Injection Volume: 2(uL)	Level: (low/med) Low
% Moisture:	GPC Cleanup; (Y/N) N
Analysis Batch No.: 274392	Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
83-32-9	Acenaphthene	52	J H	480	40
208-96-8	Acenaphthylene	210	JH	480	37
120-12-7	Anthracene	ND	Ħ	480	27
56-55-3	Benzo[a]anthracene	ND.	H	480	35
50-32-8	Benzo[a]pyrene	ND.	H	480	45
205-99-2	Benzo[b]fluoranthene	ND	H	480	33
191-24-2	Benzo(q,h,ilperylene	ND	H	480	34
207-08-9	Benzo[k]fluoranthene	ND.	10	480	7.0
218-01-9	Chrysene	.ND	H	480	32
53-70-3	Dibenz (a,h) anthracene	.ND	H	480	41
206-44-0	Fluoranthene	ND	H	480	39
86-73-7	Fluorene	47	JH	480	35
193-39-5	Indeno[1,2,3-cd]pyrene	ND	\mathcal{H}	480	45
91-20-3	Naphthalene	1800	H	480	7.3
85-01-8	Phenanthrene	49	JH	480	42
129-00-0	Pyrene	ND	H	480	33

CAS NO.	SURROGATE	% REC	Q	LIMITS
321-60-8	2-Fluorobiphenyl	87		48-120
4165-60-0	Nitrobenzene-d5 (Surr)	0	X.	46-120
1718-51-0	p-Terphenyl d14 (Surr)	76		67-150

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Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1		
SDG No.:			
Client Sample ID: P-01-030515-1557	Lab Sample ID: 480-89467-10		
Matrix; Water	Lab File ID: V60019.D		
Analysis Method: 8270D	Date Collected: 03/05/2015 15:57		
Extract, Method: 3510C	Date Extracted: 11/06/2015 12:33		
Sample wt/vol: 257.5(mL)	Date Analyzed: 11/10/2015 19:19		
Con. Extract Vol.: 1(mL)	Dilution Factor: 20		
Injection Volume: 2(uL)	Level; (low/med) Low		
% Moisture:	GPC Cleanup: (Y/N) N		
Analysis Batch No.: 273999	Units: ug/L		

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
83-32-9	Acenaphthene	ND	Н	97	8.0
208-96-8	Acenaphthylene	ND	H	97	7.4
120-12-7	Anthracene	ND	H	97	5.4
56-55-3	Benzo[a]anthracene	ND	H	97	7.0
50-32-8	Benzo[a]pyrene	ND	H	97	9.1
205-99-2	Benzo[b] fluoranthene	ND	H	97	6.6
191-24-2	Benzolg,h,ilperylene	NĐ	H	97	6.8
207-08-9	Benzo[k]fluoranthene	ND	Н	97	14
218-01-9	Chrysene	ND	H	97	6.4
53-70-3	Dibenz (a, h) anthracene	ND	H	97	B.2
206-44-0	Fluoranthene	ND	H	97	7.8
86-73-7	Fluorene	ND	H	97	7.0
193-39-5	Indeno[1,2,3-cd]pyrene	ND.	H	97	9.1
91-20-3	Naphthalene	160	H	97	15
85-01-8	Phenanthrene	ND	H	97	8.5
129-00-0	Pyrene	ND	Н	97	6.6

CAS NO.	SURROGATE	% REC	Q	LIMITS
321-60-8	2-Fluorobiphenyl	81		48-120
4165-60-0	Nitrobenzene-d5 (Surr)	0	X	46-120
1718-51-0	p-Terphenyl-d14 (Surr)	67		67-150

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Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1
SDG No.:	
Client Sample ID: P-01-051315-1530	Lab Sample ID: 480-89467-13
Matrix; Water	Lab File ID: V60020.D
Analysis Method: 8270D	Date Collected: 05/13/2015 15:30
Extract, Method: 3510C	Date Extracted: 11/06/2015 12:33
Sample Wt/vol: 242.4(mL)	Date Analyzed: 11/10/2015 19:48
Con. Extract Vol.: 1(mL)	Dilution Factor: 20
Injection Volume: 2(uL)	Level; (low/med) Low
% Moisture:	GPC Cleanup: (Y/N) N
Analysis Batch No.: 273999	Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
83-32-9	Acenaphthene	ND	H	100	8.5
208-96-8	Acenaphthylene	ND	H	100	7.8
120-12-7	Anthracene	ND	H	100	5.8
56-55-3	Benzo[a]anthracene	ND	H	100	7.4
50-32-8	Benzo[a]pyrene	NI	H	100	9.7
205-99-2	Benzo[b] fluoranthene	ND	H	100	7.0
191-24-2	Benzo[g,h,i]perylene	ND	H	100	7.2
207-08-9	Benzo[k]fluoranthene	ND	Н	100	15
218-01-9	Chrysene	ND	H	100	6.8
53-70-3	Dibenz(a,h)anthracene	ND	H	100	8.7
206-44-0	Fluoranthene	ND	H	100	8.3
86-73-7	Fluorene	ND	H	100	7.4
193-39-5	Indeno[1,2,3-cd]pyrene	ND.	Н	100	9.7
91-20-3	Naphthalene	28	JH	100	16
85-01-8	Phenanthrene	ND	H	100	9.1
129-00-0	Pyrene	ND	Н	100	7.0

CAS NO.	SURROGATE	% REC	Q	LIMITS
321-60-8	2-Fluorobiphenyl	95		48-120
4165-60-0	Nitrobenzene-d5 (Surr)	0	X	46-120
1718-51-0	p-Terphenyl-d14 (Surr)	83		67-150

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Lab Sample ID: 480-89467-14 Lab File ID: X009014108.D
Lab File ID: X009014108.D
Date Collected: 03/18/2015 15:30
Date Extracted: 11/04/2015 13:45
Date Analyzed: 11/05/2015 16:34
Dilution Factor: 100
Level: (low/med) Low
GPC Cleanup; (Y/N) N
Units: ug/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
83-32-9	Acenaphthene	430000	H	260000	3100
208-96-8	Acenaphthylene	930000	H	260000	2200
120-12-7	Anthracene	ND	H	260000	6600
56-55-3	Benzo[a]anthracene	ND	H	260000	4500
50-32-8	Benzo[a]pyrene	ND	H	260000	6300
205-99-2	Benzo[b] fluoranthene	ND	H	260000	5100
191-24-2	Benzo[a,h,i]perylene	ND	H	260000	3100
207-08-9	Benzo[k]fluoranthene	ND	H	260000	2900
218-01-9	Chrysene	ND	H	260000	2600
53-70-3	Dibenz (a, h) anthracene	ND	H	260000	3100
206-44-0	Fluoranthene	400000	H	260000	3700
86-73-7	Fluorene	770000	H	260000	6000
193-39-5	Indeno[1,2,3-cd]pyrene	ND	Н	260000	7200
91-20-3	Naphthalene	2300000	H	260000	4300
85-01-8	Phenanthrene	270000	H	260000	5400
129-00-0	Pyrene	560000	Н	260000	1700

CAS NO.	SURROGATE	%REC	Q	LIMITS
321-60-8	2-Fluorobiphenyl	94		37-120
4165-60-0	Nitrobenzene-d5 (Surr)	65		34-132
1718-51-0	p-Terphenyl-d14 (Surr)	94		65-153

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Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1
SDG No.:	
Client Sample ID: 0S-01-042415-1600	Lab Sample ID: 480-89467-15
Matrix; Waste	Lab File ID: X009014109.D
Analysis Method: 8270D	Date Collected: 04/24/2015 16:00
Extract, Method: 3580A	Date Extracted: 11/04/2015 13:45
Sample Wt/vol: +0.11(g)	Date Analyzed: 11/05/2015 17:01
Con. Extract Vol.: 1(mL)	Dilution Factor: 10
Injection Volume: 1(uL)	Level: (low/med) Low
% Moisture:	GPC Cleanup; (Y/N) N
Analysis Batch No.: 273506	Units: ug/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
83-32-9	Acenaphthene	390000	H	31000	360
208-96-8	Acenaphthylene	1400000	H	31000	250
120-12-7	Anthracene	230000	H	31000	780
56-55-3	Benzo[a]anthracene	150000	H	31000	530
50-32-8	Benzo[a]pyrene	96000	H	31000	750
205-99-2	Benzo[b] fluoranthene	34000	H	31000	600
191-24-2	Benzolg, h, ilperylene	62000	H	31000	360
207-08-9	Benzo[k]fluoranthene	82000	Н	31000	350
218-01-9	Chrysene	140000	H	31000	310
53-70-3	Dibenz (a,h) anthracene	ND	H	31000	360
206-44-0	Fluoranthene	410000	H	31000	440
86-73-7	Fluorene	590000	H	31000	710
193-39-5	Indeno[1,2,3-cd]pyrene	42000	H	31000	850
91-20-3	Naphthalene	3600000	H	31000	510
85-01-8	Phenanthrene	1200000	H	31000	640
129-00-0	Pyrene	580000	Н	31000	200

CAS NO.	SURROGATE	%REC	Q	LIMITS
321-60-8	2-Fluorobiphenyl	102		37-120
4165-60-0	Nitrobenzene-d5 (Surr)	8.8		34-132
1718-51-0	p-Terphenyl-d14 (Surr)	101		65-153

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Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1
SDG No.:	
Client Sample ID: 0S-01-042815-1600	Lab Sample ID: 480-89467-16
Matrix; Waste	Lab File ID: X009014110.D
Analysis Method: 8270D	Date Collected: 04/28/2015 16:00
Extract, Method: 3580A	Date Extracted: 11/04/2015 13:45
Sample Wt/vol: +0.12(g)	Date Analyzed: 11/05/2015 17:28
Con. Extract Vol.: 1(mL)	Dilution Factor: 200
Injection Volume: 1(uL)	Level: (low/med) Low
% Moisture:	GPC Cleanup; (Y/N) N
Analysis Batch No.: 273506	Units: ug/Kg
Analysis Batch No.: 2/3506	Units: ug/kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
83-32-9	Acenaphthene	220000	JH	570000	6700
208-96-8	Acenaphthylene	610000	H	570000	4700
120-12-7	Anthracene	ND	H	570000	14000
56-55-3	Benzo[a]anthracene	ND	H	570000	9700
50-32-8	Benzo[a]pyrene	NI	H	570000	14000
205-99-2	Benzo[b] fluoranthene	ND	H	570000	11000
191-24-2	Benzo[g,h,i]perylene	ND	H	570000	6700
207-08-9	Benzo[k]fluoranthene	ND	Н	570000	6300
218-01-9	Chrysene	ND	H	570000	5700
53-70-3	Dibenz (a,h) anthracene	ND	H	570000	6700
206-44-0	Fluoranthene	270000	JH	570000	8000
86-73-7	Fluorene	420000	JH	570000	13000
193-39-5	Indeno[1,2,3-cd]pyrene	ND	Н	570000	15000
91-20-3	Naphthalene	1100000	H	570000	9300
85-01-8	Phenanthrene	ND	H	570000	12000
129-00-0	Pyrene	450000	JH	570000	3700

CAS NO.	SURROGATE	% REC	Q	LIMITS
321-60-8	2-Fluorobiphenyl	83		37-120
4165-60-0	Nitrobenzene-d5 (Surr)	10	X	34-132
1718-51-0	p-Terphenyl-d14 (Surr)	81		65-153

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Job No.: 480-89467-1
Lab Sample ID: 480-89467-17
Lab File ID; X009014111.D
Date Collected: 05/07/2015 16:30
Date Extracted: 11/04/2015 13:45
Date Analyzed: 11/05/2015 17:55
Dilution Factor: 100
Level: (low/med) Low
GPC Cleanup; (Y/N) N
Units: ug/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
83-32-9	Acenaphthene	ND.	Н	280000	3300
208-96-8	Acenaphthylene	0000080	H	280000	2300
120-12-7	Anthracene	ND	H	280000	7200
56-55-3	Benzo[a]anthracene	ND	H	280000	4800
50-32-8	Benzo[a]pyrene	120000	JH	280000	6800
205-99-2	Benzo[b] fluoranthene	ND	H	280000	5500
191-24-2	Benzo[g,h,i]perylene	ND	H	280000	3300
207-08-9	Benzo[k]fluoranthene	ND	H	280000	3200
218-01-9	Chrysene	170000	JH	280000	2800
53-70-3	Dibenz (a, h) anthracene	ND	H	280000	3300
206-44-0	Fluoranthene	610000	H	280000	4000
86-73-7	Fluorene	590000	H	280000	6500
193-39-5	Indeno[1,2,3-cd]pyrene	ND.	H	280000	7800
91-20-3	Naphthalene	1200000	H	280000	4700
85-01-8	Phenanthrene	410000	H	280000	5800
129-00-0	Pyrene	750000	Н	280000	1800

CAS NO.	SURROGATE	%REC	Q	LIMITS
321-60-8	2-Fluorobiphenyl	97		37-120
4165-60-0	Nitrobenzene-d5 (Surr)	94		34-132
1718-51-0	p-Terphenyl-d14 (Surr)	103		65-153

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Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1
SDG No.:	
Client Sample ID: P-01-101514-0910	Lab Sample ID: 480-89467-18
Matrix; Water	Lab File ID; V60021.D
Analysis Method: 8270D	Date Collected: 10/15/2014 09:10
Extract, Method: 3510C	Date Extracted: 11/06/2015 12:33
Sample Wt/vol: 267(mL)	Date Analyzed: 11/10/2015 20:17
Con. Extract Vol.: 1(mL)	Dilution Factor: 20
Injection Volume: 2(uL)	Level: (low/med) Low
% Moisture:	GPC Cleanup; (Y/N) N
Analysis Batch No.: 273999	Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
83-32-9	Acenaphthene	ND	H	94	7.7
208-96-8	Acenaphthylene	ND	H	94	7.1
120-12-7	Anthracene	ND	H	94	5.2
56-55-3	Benzo[a]anthracene	ND	H	94	6.7
50-32-8	Benzo[a]pyrene	ND	H	94	8.8
205-99-2	Benzo[b] fluoranthene	ND	H	94	6.4
191-24-2	Benzolg,h,i]perylene	NĐ	H	94	6.6
207-08-9	Benzo[k]fluoranthene	ND	Н	94	14
218-01-9	Chrysene	ND	H	94	6.2
53-70-3	Dibenz(a,h)anthracene	ND	H	94	7.9
206-44-0	Fluoranthene	ND	H	94	7.5
86-73-7	Fluorene	ND	H	94	6.7
193-39-5	Indeno[1,2,3-cd]pyrene	ND.	Н	94	8.8
91-20-3	Naphthalene	20	JH	94	14
85-01-8	Phenanthrene	ND	H	94	8.2
129-00-0	Pyrene	ND	Н	94	6.4

CAS NO.	SURROGATE	%REC	Q	LIMITS
321-60-8	2-Fluorobiphenyl	9.3		48-120
4165-60-0	Nitrobenzene-d5 (Surr)	0	X	46-120
1718-51-0	p-Terphenyl-d14 (Surr)	74		67-150

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Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1
SDG No.:	
Client Sample ID: P-01-100814-1120	Lab Sample ID: 480-89467-19
Matrix: Water	Lab File ID: V60022.D
Analysis Method: 8270D	Date Collected: 10/08/2014 11:20
Extract, Method: 3510C	Date Extracted: 11/06/2015 12:33
Sample Wt/vol: 257.5(mL)	Date Analyzed: 11/10/2015 20:46
Con. Extract Vol.: 1(mL)	Dilution Factor: 20
Injection Volume: 2(uL)	Level: (low/med) Low
% Moisture:	GPC Cleanup; (Y/N) N
Analysis Batch No.: 273999	Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
83-32-9	Acenaphthene	ND	H	97	8.0
208-96-8	Acenaphthylene	ND	H	97	7.4
120-12-7	Anthracene	ND	H	97	5.4
56-55-3	Benzo[a]anthracene	ND	H	97	7.0
50-32-8	Benzo[a]pyrene	ND	H	97	9.1
205-99-2	Benzo[b] fluoranthene	ND	H	97	6.6
191-24-2	Benzolg,h,i]perylene	ND	H	97	6.8
207-08-9	Benzo[k]fluoranthene	ND	Н	97	14
218-01-9	Chrysene	ND	H	97	6.4
53-70-3	Dibenz (a, h) anthracene	ND	H	97	B.2
206-44-0	Fluoranthene	ND	H	97	7.8
86-73-7	Fluorene	ND	H	97	7.0
193-39-5	Indeno[1,2,3-cd]pyrene	ND	Н	97	9.1
91-20-3	Naphthalene	18	JH	97	15
85-01-8	Phenanthrene	ND	H	97	8.5
129-00-0	Pyrene	ND	Н	97	6.6

CAS NO.	SURROGATE	%REC	Q	LIMITS
321-60-8	2-Fluorobiphenyl	94		48-120
4165-60-0	Nitrobenzene-d5 (Surr)	0	X	46-120
1718-51-0	p-Terphenyl-d14 (Surr)	98		67-150

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Lab Sample ID: 480-89467-20 Lab File ID: V60023.D
Lab File ID: V60023.D
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Date Collected: 01/30/2015 09:15
Date Extracted: 11/06/2015 12:33
Date Analyzed: 11/10/2015 21:15
Dilution Factor: 20
Level: (low/med) Low
GPC Cleanup; (Y/N) N
Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
83-32-9	Acenaphthene	17	JH	98	8.0
208-96-8	Acenaphthylene	140	H	98	7.4
120-12-7	Anthracene	11	JH	98	5.5
56-55-3	Benzo[a]anthracene	ND	H	9.8	7.0
50-32-8	Benzo[a]pyrene	ND	H	98	9.2
205-99-2	Benzo[b] fluoranthene	ND	H	98	6.7
191-24-2	Benzolg,h,i]perylene	ND	H	98	6.8
207-08-9	Benzo[k]fluoranthene	ND	Н	98	14
218-01-9	Chrysene	ND	H	98	6.5
53-70-3	Dibenz (a, h) anthracene	ND	H	9.8	8.2
206-44-0	Fluoranthene	9.7	JH	98	7.8
86-73-7	Fluorene	26	JH	98	7.0
193-39-5	Indeno[1,2,3-cd]pyrene	ND	Н	98	9.2
91-20-3	Naphthalene	1400	E H	98	15
85-01-8	Phenanthrene	33	JH	98	8.6
129-00-0	Pyrene	ND	Н	98	6.7

CAS NO.	SURROGATE	%REC	Q	LIMITS
321-60-8	2-Fluorobiphenyl	118		48-120
4165-60-0	Nitrobenzene-d5 (Surr)	0	X.	46-120
1718-51-0	p-Terphenyl-d14 (Surr)	65	X	67-150

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Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1
SDG No.:	
Client Sample ID: P-01-013015-0915 DL	Lab Sample ID: 480-89467-20 DL
Matrix; Water	Lab File ID: V60048.D
Analysis Method: 8270D	Date Collected: 01/30/2015 09:15
Extract, Method: 3510C	Date Extracted: 11/05/2015 12:33
Sample wt/vol: 255.5(mL)	Date Analyzed: 11/11/2015 14:45
Con. Extract Vol.: 1(mL)	Dilution Factor: 100
Injection Volume: 2(uL)	Level: (Iow/med) Low
% Moisture:	GPC Cleanup; (Y/N) N
Analysis Batch No.: 274392	Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
83-32-9	Acenaphthene	ND	H	490	40
208-96-8	Acenaphthylene	140	JH	490	37
120-12-7	Anthracene	ND	H	490	27.
56-55-3	Benzo[a]anthracene	ND.	H	490	35
50-32-8	Benzo[a]pyrene	ND.	H	490	46
205-99-2	Benzo[b]fluoranthene	ND	H	490	33
191-24-2	Benzo(q,h,ilperylene	ND	H	490	34
207-08-9	Benzo[k]fluoranthene	ND.	10	490	71
218-01-9	Chrysene	.ND	H	490	32
53-70-3	Dibenz (a,h) anthracene	.ND	H	490	41
206-44-0	Fluoranthene	ND	H	490	39
86-73-7	Fluorene	ND	H	490	35
193-39-5	Indeno[1,2,3-cd]pyrene	ND.	10	490	46
91-20-3	Naphthalene	1600	H	490	74
85-01-8	Phenanthrene	ND	H	490	43
129-00-0	Pyrene	ND.	H	490	33

CAS NO.	SURROGATE	%REC	Q	LIMITS
321-60-8	2-Fluorobiphenyl	89		48-120
4165-60-0	Nitrobenzene-d5 (Surr)	0	X	46-120
1718-51-0	p-Terphenyl d14 (Surr)	72		67-150

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Job No.: 480-89467-1
Lab Sample ID: 480-89467-22
Lab File ID: X009014112.D
Date Collected: 10/15/2014 09:10
Date Extracted: 11/04/2015 13:45
Date Analyzed: 11/05/2015 18:21
Dilution Factor: 100
Level: (low/med) Low
GPC Cleanup; (Y/N) N
Units: ug/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
83-32-9	Acenaphthene	ND.	H	260000	3100
208-96-8	Acenaphthylene	470000	H	260000	2200
120-12-7	Anthracene	ND	H	260000	6600
56-55-3	Benzo(a)anthracene	ND	H	260000	4500
50-32-8	Benzo[a]pyrene	ND	H	260000	6300
205-99-2	Benzo[b] fluoranthene	ND	H	260000	5100
191-24-2	Benzolg,h,i]perylene	NĐ	H	260000	3100
207-08-9	Benzo[k]fluoranthene	ND	Н	260000	2900
218-01-9	Chrysene	ND	H	260000	2600
53-70-3	Dibenz (a,h) anthracene	ND	H	260000	3100
206-44-0	Fluoranthene	190000	JH	260000	3700
86-73-7	Fluorene	300000	H	260000	6000
193-39-5	Indeno[1,2,3-cd]pyrene	ND.	Н	260000	7200
91-20-3	Naphthalene	1200000	H	260000	4300
85-01-8	Phenanthrene	ND	H	260000	5400
129-00-0	Pyrene	200000	JH	260000	1700

CAS NO.	SURROGATE	%REC	Q	LIMITS
321-60-8	2-Fluorobiphenyl	73		37-120
4165-60-0	Nitrobenzene-d5 (Surr)	0	X.	34-132
1718-51-0	p-Terphenyl-d14 (Surr)	78		65-153

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FORM VI GC/NS SEMI VOA BY INTERNAL STANDARD - INITIAL CALIBRATION DATA CURVE EVALUATION

Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1	Analy Batch No.: 271208
SDG No.:		
Instrument ID: HP5973V	GC Column: RXI-58il MS ID: 0.25(mm)	Heated Furge: (Y/N) N
ration Start Date: 10/26/2015 19:36	Calibration Start Date: 10/26/2015 19:36 Calibration End Date: 10/26/2015 22:31	Calibration ID: 25393

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	1C 480-271208/3	V53788.D
Level 2	JC 480-271208/4	V53781.D
Level 3	JC 480-271208/5	V53782.D
Level 4	JCIS 480-271208/6	V53783.D
Level 5	IC 480-271208/7	V53784,D
Level 6	10 480-271208/8	V53785.D
Level 7	10 480-271208/9	V53786.D

ANALYTE			ini of of		9	CURVE	COE	COEFFICIENT	· a	MIN RRE	SRSD	# MAX	_	# MIN R^2
	LVL 1 LVL 6	LVL 2 LVL 7	E TAT	LVL 4	LVL 5	TYPE	B	NCT M2	Į.			FRED	OR COD	OR COD
1,4-Dioxane	0.3775	0.4213	0.4886	0.4715	D.4825 L	Lin1 -0	-0.025 6.	0.4762					0.9990	0.9900
N-Nitrosodimethylamine	0.6528	0.6936	0.3798	0.7550	0.7559 Linl		-0.014 0.7415	7415					0.9990	0.8900
Pyridine	1,2747	1,3558	1,4288	1,3944	1,4241 Ave	Ne.	H	1,3841			w	20.0		
Benzaldehyde	0.4532	0.3607	0.8670	0,3938	0,8068 L	Lini -0.	-0.146 0.	0.7600		0.0100	1		0.9630	0066'0 +
Phenol	1.4516	1.4021	1.5874	1.4950	1.5124 A	Ave	÷	1.4821		0.8000	4.0	20.0		
An line	1,8918	1.8214	1,9675	1,9788	I.9356 A	Ave	F	1.9046			ri m	20.0		
Bis(2-chloroethyl)ether	1.2152	1.2554	1.3655	1.2467	1.2937 A	Ave	T.	1.2831		0.7000	(7)	20.0		
2-Chlorophenol	1.1934	1.2780	1.3535	1.3206	1.3298 Lin1		-0.020 1.	1.3152		0.8000	3	4	1.0000	0066.0
n-Decane	2,1071	1.9483	2,1006	2,0259	1.9726 A	Ave	H	1.9858		0.0100	0.0	20,0		
1, 3-Dichlorobenzene.	1,4091	1.4128	1.5074	1,4748	1.4740 A	Ave	T.	1,4537			2,4	20.0		
1, 4-Dichlorobenzene	1.4798	1.4674	1.5513	1.5049	1.5195 A	Ave	1.	1,4991			2.0	20.0		
Benzyl alcohol	0.7999	0.8058	6888.0	0,8583	0.8769 Ave	ve.	0	0.8436			4	20.0		
1, 2-Dichlorobenzene	1.4478	1.3838	1.4546	1.4102	1.4132 A	Ave	÷	1.4071			o)	20.0		
2-Methylphenol	1,0946	1.0774	1.2065	1,1840	1.2053 B	Ave	1	1.1543		0.7000	4.4	20.02		

Note: The mi coefficient is the same as Ave RRF for an Ave curve type.

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FORM VI GC/MS SEMI VOA BY INTERNAL STANDARD - INITIAL CALIBRATION DATA CURVE EVALUATION

SDG No.:														
Instrument ID: HP5973V			GC Column:		RXI-5Sil	MS	ID: 0.25 (mm)	m).	Hea	Heated F	Furge:	(N/X)	Z	
Calibration Start Date: 10/26/2015	-	9:36	Calib	ration	Calibration End Date:	e: 10/	10/26/2015	22:31	Cal	Calibration		ID: 25393	60	
ANALYTE			(N)			CURVE	ZOEEE	COEFFICIENT	MIM #	MIN RRE	*RSD #	MAX	R/E	MIN RYZ
	LVL 1 LVL 6	LVL 2 LVL 7	EVE 3	LVL 4	TAT 2	TYPE	B MI	M2				BRSD	OR COD	ORO
bis (2-chloroisopropyl) ether	7.7527	2.5470	0669.	2,6270	8.5671 A	Ave	2,5845	15	0	0.010.0	4.6	20.0		
Indene	0.6185	0.5902	0.6272	0.5094	0.6159 Ave	Ne.	0.6110	10			o	20.0		
4-Methylphenol	1,1285	1.1624	1.2658	1,2188	1.2325 2	Ave	1.1918	81	0	0.6000	e.	20.0		
N-Nitrosedi-n-propylamine	0.7613	0.3913	0.8595	0.7998	0.7895 Ave	ve	0.8006	90	0	0.5000	9	20.0		
Acetophenone	1.6269	1.5869	1,7893	1.7004	1.6851	Ave	1.6708	86	0	0.0100	(7)	20.0		
Hexachloroethane	0.5706		0,6228	0.6072	0.6201 7	Ave	0.5976	9/	0	0.3000	ON.	20,0		
Nitrobenzene	0.3310		0.3484	0.3356	0.3493 #	Ave	0.3393	93	Ö	0.2000	a.	20.0		
Isophorone	0.5929	100	0.5603	0,5356	1103.0	Ave	0.5778	182	6	0.4000	i-1 10	20.0		
2,4-Dimethylphenol	0,3193	0.3144	0.3507	0,3259	0.3328 7	Ave	0.3293	69	0	0.2000	3.6	20.0		
2-Nitrophenol	0.1602		0.2009	0.1948	0.2032 1	Lin1	-0.014 0.2030	30	Ó	0.1000	H		1.0000	0.9900
Benzoic acid	+++++	0.2793	0,2117	0.2402	0.2655 1	Lin1 -	-0.138 0.285%	9.6					056670	0066,0
Bis(2-chloroethoxy)methane	0.4034	0.3682	0.4032	0,3636	0,3745 Ave	Ne.	0,3772	12	6	0.3000	8.4	20.0		
2,4-Dichlotophenel	0.2717	0.2693	0.3030	0.2853	D.2901 /	Ave	0.2857	22	ó	0.2000	4	20.0		
I.2, 4-Trichlorobensene	0.3350	0.3211	0.3365	0.3252	0.3380 2	Ave	0.3314	4		7	σi,	20.0		
Naphthalene	1.0739	1,0099	1,0661	1,0144	1,0173 7	Ave	1.0209	99	6	0.7000	6.0	20.0		
4-Chlocoanline	0.5391	0.5112	0.5546	0.5350	0.5690 2	Ave	0.5492	92	0	0.010.0	4.0	20.0		
2,6-Dichlorophenol	0,2860		0.2942	0,2864	0.2896	Ave	0,2874	7.4			1.9	20,0		
Hewachlorobutadiene	0.1934	0.1841	0.1990	0,1926	0.2008	Ave	0.1962	64	0	0.0100	m m	20.0		
Caprolactam	0.0718	0.0902	0.1073	0.1099	0.1208	Lini -	elli 0.1119	61	d	0,010,0			0,9980	0,8900
4-chloro-3-methylphenol	0.2458	0.2461	0.2797	0,2823	0.2958 Ave	Ne	0.2785	35	0	0.2000	8.5	20.0		

Note: The mi coefficient is the same as Aye RRF for an Aye curve type.

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FORM VI GC/MS SEMI VOA BY INTERNAL STANDARD - INITIAL CALIBRATION DATA CURVE EVALUATION

Lab Name: DestAmerica Buffalo SDG No.:	ö		Job No.:		480-89467-1	H				Analy	Analy Batch No.:		271208		
Instrument ID: HP5973V			GC 60	Column: R	RXI-58il	MS	ID: 0.2	0.25 (mm)		Heated	d Furge:	e: (X/N)	N (N		
Calibration Start Date: 10/26	/2015 1	9:36	Calib	Calibration	End Date:	e: 10	10/26/201	db 22:31	31	Calib	Calibration	ID:	25393		
ANALYTE			50 50 60 60		f	CURVE	5	COEFFICIENT	T	4 MIN BRE	RE BRED	MAM #		MIN #	E.S
	LVL 1 LVL 6	LVL 7	LVL 3	LVL 4	TAT 2	TVPE	a	KI	M2			FRSI	0	O.R.	COD
2-Nethylnaphthalene	0.7080	0.6394	0.7230	0.8647	0.6908	Ave		0989.0		0.4000	00 3.3	20.0	0.		
1-Nethylnaphthalene	0.6591	0.6142	0.6639	0.6112	88859.0	Ave		0.6344		0.0100	3.3	20.0	0		
Hexachlorocyclopentadiene	0.4523	0.4230	0.4599	0.4370	0.4456	Lung	-0.018	0.4508		0.0500	00		1.0000	510	006610
1, 2, 4, 5-Tetrachlorobensene	0.5750	0.5591	0.5804	0.5487	0.5547	Ave		0.5662		0.0100	00 2.1	20.0	0		
2, 4, 6-Trichlorophenol	0.3404	0.3497	0.3730	0.3929	0.3933	Ave		0,3808		0.2000	00 7.2	20.0	o		
2, 4, 5-Trishlerophenel	0.3778	0.3521	0,4163	0,4059	0.4135	Ave		0.4014		0.2000	9.9 00	20.0	0		
Biphenyl	1,5910	100	1.5337	4.480	1.4805	Ave		1.5129		0,0100	00 2.9	20.0	0		
2-Chloronaphthalene	1,2530	1.1344	T.1903	1,1238	T-1262	Ave		1,1630		0.8000	00 4.0	20.0	0		
2-Nitroaniline	0,2868	0.3330	0.3645	0,3591	0.3700	riul	-0.030	0.3802		0.0100	00		056610	610	0.9900
Dimethyl phthalate	1.2889		1.3555	1.3127	1.2868	Ave.		1.3027		0.0100	00 2.0	20.0	0		
1, 3-Dinitrobenzene	0,0958		0.1273	0.1303	0.1402	Lin1	-0.018	0.1426					0,9980	0,9	0,3900.
2,6-Dinitrotoluene	0.3292		0.3110	0.3147	0.3128	Lini	-0.021	0,3249					1,0000	0.9	0.9900
Acenaphthylene	1.8555	1.7911	1,9428	1.9227	1.8372	Ave		1,8560		0,900	3.2	20.0	0		
3-Nitroamiline	0.3114	0.3223	0.3777	0.3623	0.3696	Lini	-0.023	0.3770		0.0100	00		0566'0	6.0	005610
2,4-Dinitrophenol	0.2267		0.1837	0,1966	0,2115	Lin1	-0.082	0.2233		0.0100	00		0966'0	6,0	0066'0
4-Nitrophenol	0.1430		0.1705	0.1699	0.1755	Linl	-0.021	0.1783		0.0100	00		1,0000	00	0.9900
Acenaphthene	1,2310	1,1569	1,2377	1,2086	1.1684	ave		1.1891		0.9000	0.0 3.0	20.0	0		- [
2, 4-Dinittotoluene	0.3165	0.3763	0.4204	0,4149	6.4179	Linl	-0.034	0.4306		0.2000	00		1,0000	6'0	0066'0
Dibenzofuran	1.6427	1.6900	1.7801	1.6980	5229.1	Ave		1.6638		0.8000	00 4.0	20,0	0		
2, 3, 4, 6-Tetrachlorophenol	0.2718	1	0.3312	0,3408	0.3443	Lin1	-0.029	0.3544		0.0100	00		056610	5+0	006610

Note: The mi coefficient is the same as Ave RRF for an Ave curve type.

FORM VI 8270D

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FORM VI GC/MS SEMI VOA BY INTERNAL STANDARD - INITIAL CALIBRATION DATA CURVE EVALUATION

Lab Name: TestAmerica Buffalo SDG No.:	falo		Job No.:		480-89467-1	el .			Analy Batch No.:	Batch		271208	Ĭ
Instrument ID: HP5973V			GC (Co	Column: B	RXI-58il	MS ID	: 0.25 (mm)	m)	Heated	Furge:	(N/X) :	N	
Calibration Start Date: 10/26	72015 1	9:36	Calib	ration	Calibration End Date:		10/26/2015	22:31	Calibration	ation	ID: 25393	893	
ANALYTE			(A)		0	CURVE	COEFE	COEFFICIENT	4 MIN RRE	* *RSD	# MAX	B.12	1.00
	LVL 1 LVL 6	LVL 2 LVL 7	EVL 3	LVL 4	LVL 5	TYPE	B MI	MZ			BRSD	OR COD	OR COD
Hexadecane	0.7009	0.6360	0.7602	0,6832	0.6552 A	Ave	0,6634	34	0.0100	4.9	20.0		
Diethyl phthalate	8.0204		2.2545	1.7259	1.8136 1	Lini 1.	1.7014 1.3152	52	0.0100			0.9990	0.9900
4-Chlorophenyl phenyl ether	0.6548		1799.0	0.6553	0.6608 #	Ave	0.6674	7.4	0.4000	65.2	20.0		
4-Nitroaniline	0.2584	0.3103	0.3481	0.3537	0.3603 1	Linl -0	-0.036 0.3701	10	0.0100			0,9990	0.9900
Fluorene	1.3728	-	1.4635	1.3955	1.3618 P	Ave	1.3840	40	0.9000	2.9	20.0	ij	
4.6-Dinitro-2-methylphenol	0,0854		0,1322	0.1413	0.1517 1	Lin1 -0	-0.053 0.1565	65	0.0100			0,9980	0.9900
Diphenylamine	0.6598		0.7036	0.6765	0.6502	Ave	0.6569	69		ल	20.0		
N-Nitrosodiphenylamine	0,5842	100	0.6016	0.5784	0.8559 4	Ave	0.561	17	0.0100	4.1	20.0		
1,2-Diphenylhydrazine	0.6856	-	0.7467	0,7168	0.7178	Ave	7607.0	7.6		r.	20.0		
trans-Azobensene	0,6856	-	0.1467	0.7108	0.7178 #	Ave	7807.0	9.7		61	20.0		
4-Bromophenyl phenyl ether	0.2432	-	0.2507	0,2492	0.2506 P	Ave	0,2476	7.6	0.1000	2.3	20.0		1
Atuatine	0.3153	-	0,3862	0,3633	0,3722 1	Lini -0	-0.011 0.3721	21	0.0100			1,0000	0,9900
Hexachlotobenzene	0.2922		1662.0	0.2881	D.2914 A	Ave	0.2903	03	0.1000	60.	20.0		
n-Octadecane	0.6386		0.6844	0.6694	0.6545 2	Ave	0.6565	65	0.0100	2.4	20.0		
Bentachlotophenol	0.1192	_	0.1735	0.1781	0.1864 I	Lin1 -0	-0.047 0.1894	76	0.0500			0566'0	0,9900
Phenanthrene	1.1237		1.1492	1,1057	1.0790 2	Ave	1,0901	10	0.7000	9.00	20.0		
Anthracene	1,0820		1,1356	1,1089	1.0798 #	Ave	1,0803	63	0,7000	eri (m)	20,0		
Carbazole	1.0205	111	1,0826	1.0514	1.0178 A	Ave	1,0288	00	0.0100	2.9	20.0		
Di-n-butyl phthalate	1.7833		1,4880	1.4154	1.3396 Lini		0.1574 1.2818	18	0.0100			0.9970	0,8800
Fluoranthene	1.1776		1,2620	1.2256	1.2134 P	Ave	1.1995	95	0.6000	6.9	20.0		

Note: The mi coefficient is the same as Ave RRF for an Ave curve type.

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FORM VI GC/MS SEMI VOA BY INTERNAL STANDARD - INITIAL CALIBRATION DATA CURVE EVALUATION

CC_GOLUMN: RXL-SS1 NS CALIFFRAÇÃO E CALIFFRAÇÃO ELG Date: 10/26/2015 22:31 Calibração ID: 25393 RAS RA	SDG No.:	0		cop wo		1070782010				- Analy	Austy batch No.:		217508	
Coli	Instrument ID: HP5973V			GC .Co	100	-58il	in	0.25 (mm)		Heated				
Colored Colo	Calibration Start Date: 10/2	/2015 1	:36	Calib	ration			ari	T.	Calibr			393	
1,125 1,125 1,126 1,12	ANALYTE			55 50 (#)		00	RVE	COEFFICIEN	1	-	*RSD	-	50	MIN
Colored Colo						(in		KI	MZ			SRSD	OR COD	OR COD
1.2248 1.1873 1.1873 1.1874 1	Benzidine	0.2319	0.2730	0.5785	0,3658	0,6659 Li	-						0,9750	0066'0
0.5122 0.5536 0.5736 0.6659 0.8950 0.8877 LLIA -0.035 0.6746 0.00100 1.0000 2.8 1.0000 2	Ругеле	1.2248		1.2868	1.2645	_	· o	1.2261		0.600		20.0		
1,050 1,050 1,050 1,144 1,1442 1,1442 1,1412 1,000 1,1452 1,1412 1,1442 1,1442 1,1412 1,1452 1,1444 1,1442 1,1444	Butyl benzyl phthalate	0.6192		990970	0.6148	-		-		0.010	6		1,0000	0066'0
1,0902	Bis(2-ethylhexyl) phthalate	0.8746	0.7762	0.8699	0.8760	-				0.010			1,0000	0.9900
1.0322 1.031 1.1511 1.1444 1.1442 Ave 1.1227 0.8000 2.8 20.0 1.0422 1.0277 1.0557 1.0565 1.0567 1.0565 1.0577 1.0565 1.0567 1.0565 1.0577 1.0565 1.0567 1	3, 3'-Dichlorobenzidine	0.3526		0.4480	0.4110	-		-		0.010	0		0.9980	0066.0
1.0382 1.0387 1.0384 1.0384 1.0387 1.0387 1.0629 0.7000 2.3 20.0 1.0387 1.0538 1.4382	Benzo[a]anthracene	1,0802		1,1611	1,1444	-	qs.	1,1227		0.800		20.0		
1.14559 1.2454 1.4285 2.4829 2.4824 Lin1 -0.100 1.4786 0.7000 1.0000 1.0000 1.0161 1.0528 1.1270 1.1470 2.1569 Lin1 -0.049 1.1550 0.7000 1.00	Chrysene	1.0492		1,0946	1.0907	-	al.	1.0629		0.700		20.0		
1,0161 1,0528 1,1270 1,1470 1,1369 tin1 -0.049 1,1550 0.7000 1,0000 1,0000 1,0020 1,1320 1,1723 1,1240 1,1341 1,2423 1,1250 1,11497 0.7000 0.7000 1,0	Di-n-octyl phthalate	1,1459	1.2654	1.4285	1,4829	-		-		0.010	0		0.9990	0,9900
1.0424 1.0991 1.1845 1.1570 1.1508 Lini -0.021 1.1497 0.7000 1.0000 1.0000 1.1629 1.1240 1.0991 1.0941 1.0924 1.0991 1.0942 1.0920 1.1019 Lini -0.059 1.2753 0.7000 1.00000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.00000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.000000 1.000000 1.00000 1.00000 1.00000 1.000000 1.00000 1.00000 1.000000 1.00000 1.00000 1.00000000	Benzo(b) fluoranthene	1,0161	-	7	1,1470	-		-		0.700	6		1,0000	0.9900
1.0956 1.0841 1.0920 1.1019 1.111 -0.058 1.1077 0.7000 1.00000 1.00000 1.00000 1.00000 1.00000 1.0000	Benzo[k] Eluotanthene	1.0424	-		1.1570	-	1	-		0.700			1,0000	0.9900
1.0853 1.1741 1.2423 1.2568 Lnn1 -0.059 1.2753 0.5000 1.00000 1.00000 1.00000 1.00000 1.00000 1.00000 1.0000 1.00000 1.00000 1.00000 1.00000 1.00000 1.00000 1.000	Benzo[a]pyrene	0.9285	0.9895	1.0841	1.0920	-				0.700			1,0000	0,3900
1,0056 1,0056 1,0746 4,0725 1,0841 Lini -0.056 1,0957 0,9958 0,9968 1,0241 0,9983 0,9998 4ve 0,9952 0,5000 372 20.0 1,1451 1,1055 1,1727 1,1823 1,2020 Ave 1,1676 2.7 20.0 1,1855 1,185 1,1841 1,4447 4,447 Ave 1,4355 1,4447 4,447 0,3826 0,3730 0,3547 0,3547 0,3827 Ave 0,3649 0,3649 20.0 1,455 1,3443 1,3923 1,3201 1,188 Ave 1,3593 3.7 20.0 1,455 1,3443 1,3923 1,3201 1,188 Ave 1,3593 3.7 20.0 1,455 1,3443 1,3923 1,3201 1,188 Ave 0,1549 0,154	Indeno[1,2,3-cd]pyrene	1,0883	1.1741	1.2423	1,2523	-	1	-		0.500	0		1,0000	0,9900
0.9193 0.9893 1.0241 0.9983 4ve 0.9952 0.5000 3.2 0.9810 0.9862 1.1727 1.1823 1.2020 Ave 1.1676 2.7 1.1855 1.1781 1.4665 1.4547 1.4647 Ave 1.4555 3.3 1.3952 1.3887 1.4847 Ave 0.3827 Ave 0.3649 5.3 0.3826 0.3750 0.3791 0.3547 0.3887 Ave 0.3649 5.3 1.4555 1.3453 1.3923 1.3201 1.3188 Ave 1.3593 3.7 1.4552 1.315 0.1822 0.1528 0.1578 Ave 0.1825 0.1825 0.9018 Ave 0.8914 2.3593	Dibenz(a, h/anthracene	1.0924	1.0978	1.0746	1.0725	-		_					1,0000	0.8900
1.1461 1.1065 1.1727 1.1823 1.2020 Ave 1.1676 2.7 1.3953 1.3867 1.4886 1.4547 Ave 1.4555 3.3 1.4619 1.4147 0.3791 0.3827 Ave 0.35649 5.3 0.3826 0.3750 1.3201 1.3188 Ave 1.3593 3.7 1.4555 1.3423 1.3201 1.3188 Ave 1.3593 3.7 1.4555 0.1849 0.1528 0.1528 0.1578 Ave 0.3829 6.9 0.1595 0.1649 0.9088 0.9088 0.9088 0.9088 0.9018 Ave 0.8914 2.7	Benzo[g,h,i]perylene	0.9881	0.9893	1,0241	0.9983		ā.	0.9852		0.500		20.0		
1.3953 1.3587 1.4986 1.4547 1.4647 Ave 1.4355 3.3 1.4619 1.4447 0.3547 0.3827 Ave 0.3549 5.3 0.3826 0.3720 0.3720 1.3283 Ave 1.3549 5.3 1.4556 1.3742 1.3215 1.3223 1.3201 1.3188 Ave 1.3593 3.7 1.4552 1.3215 0.1852 0.1528 0.1578 Ave 0.1549 6.9 0.1575 0.1849 0.9038 0.9038 0.9038 Ave 0.8914 2.7	2-Fluorophenol (Surr)	1,1461	1.1065	1.1727	1,1823	-	ú	1,1676			2.7	20.0		
0.3386 0.3318 0.3791 0.3547 0.3827 Ave 0.3649 5.3 0.3826 0.3750 1.3628 1.3201 1.5188 Ave 1.3593 3.7 1.3452 1.3315 0.1558 0.1578 Ave 0.1529 6.9 0.1359 0.1449 0.9086 0.9018 Ave 0.8914 2.7	Phenol-d5 (Surr)	1.3953		1.4986	1,4547		œ.	1.4355			07	20.0		
1.4555 1.3643 1.328 4.95 4.958 1.3583 3.7 1.4555 1.3216 4.958 1.328 4.95 4.958 1.3422 1.3216 4.958 0.1558 0.1578 4.9 0.1595 0.1649 0.908 0.908 0.908 0.908 4.9 0.9066 0.8917 0.9086 0.908 0.908 0.908 4.9 0.9066 0.8917 0.9086 0.908 0.908 0.908 0.8914 0.908 0.9066 0.8917 0.9086 0.908 0.908 0.908 0.8914 0.908 0.9066 0.8917 0.9086 0.908 0.908 0.908 0.8914 0.908 0.9066 0.8917 0.9086 0.908 0	Nitrobenzene-d5 (Surr)	0,3886		1678.0	0,3547	_	a.	0,3649			07	20,0		
Surr\ 0.1377 0.1382 0.1558 0.1578 Ave 0.1525 6.9 6.9 0.1559 0.1649 0.1598 0.9086 0.9018 Ave 0.8916 0.8917 0.9005 0.9018 0.9008 0.9018 0.9008 0.9018 0.9008 0.9018 0.9008 0.9018 0.9008 0.9018 0.9008 0.9018 0.9008 0.9008 0.9018 0.9008 0	2-Fluorobiphenyl	1,4555		1.3923	1,3201	-	0	1,3593			2.7	20.0		
0.8816 0.8471 0.9188 0.9086 0.9018 Ave 0.8914 2.7	2,4,6-Tribromophenol (Burr)	0.1377	0.1382	1	0.1528	-	di.	0.1529			0,0	20.0		
	p-Terphenyl-d14 (Surr)	0.8816		0.9188	0,9086		a)	0.8914			5.3	2010		

Note: The mi coefficient is the same as Ave RRF for an Ave curve type.

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FORM VI GC/MS SEMI VOA BY INTERNAL STANDARD - INITIAL CALIBRATION DATA RESPONSE AND CONCENTRATION

Lab Name: restAmerica burralo	Job No.: 480-89467-1	Analy Bacch No.: 2/1208
nstrument ID: HP5973V	GC Column: RXI-5Sil MS ID: 0.25(mm)	Heated Purge: (Y/N) N
libration Start Date: 10/26/2015 19:	Calibration Start Date: 10/26/2015 19:36 Calibration End Date: 10/26/2015 22:31	Calibration ID: 25393

diplation Files:	11 100		
DEVEL:	LAB SAMPLE ID:	LAB FILE ID:	
Level 1	1C 480-271208/3	V53780.D	
Level 2	35 480-271208/4	V53781.D	
Level 3	IC 480-271208/5	V53782.D	
Level 4	ICIS 480-271208/6	V53783.D	
Level 5	1C 480-271208/7	V53784.D	
Level 6	IC 480-271208/8	V53785.D	
Level 7	IC 480-271208/9	V53786.D	

ANALYTE	SH	CURVE			RESPONSE				CONCEN	CONCENTRATION (MG/UL)	(7n/5)	
	RKE	ZAAL	LVL L	LVL 2 LVL 7	EVL 3	LVL 4	TAT 2	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	1701.5
I,4-Dioxame	DCB	Lini	3519	16210	36382	70463	142723	10.0	12.0	2.00	4.00	8.00
N-Nitrosodimethylamine	DCB	Lini	6179	325230	28061	112822	233606	0.250	12.0	2.00	4.00	B.00
Eyridine	DCB	Ave	11883	52209	106382	208389	421273	0.250		2,00	4.00	8.00
Benzaldehyde	DCB	Lini	4225	344206	64556	58348	238662	0.250	1.00	2.00	4.00	8.00
Toneya	DCB	Ave	13532	650333	118195	223571	447393	10.0	-	2.00	4.00	8.00
Aniline	DCB	Aye	17636	70088	146496	295717	572570	0.250	12.0	2.00	4,00	8.00
Bis(2,-chloroethy1)ether	DCB	Ave	11328	48308	101652	186303	382675	10.0	1.00	2.00	4.00	8,00
2-Chlorophenol	DCB	Lini	11125	580764	100778	197350	393372	10.0	12.0	2.00	4,00	8.00
n-Decane	DCB	Ave	19643	74971	156408	302753	583523	0.250	1,00	2:00	4,00	8.00
I, 3-Dichlorobenzene	DCB	Ave	13136	54386	112239	220411	436015	0.250	12.00	2.00	4.00	8.00
1,4-Dichlorobenzene	DCB	Ave	13795	56518	115507	225154	449478	10.0	12.0	2.00	4,00	8,00
Benzyl alcohol	DCB	Ave	7457	371366	66928	128262	259388	0.250	1,00	2.00	4.00	8.00
I, T-Dichlorobenzene	DCB	Ave	13497	51365	108 306	210748	418039	0.250	12.0	2.00	4,00	8.00
2-Methylphenol	DCB	Ave	10204	519138	75898	176936	356526	10.0	12.0	2.00	4,00	8.00
bis (2-chloroiscpropyl) ether	DCB	Ave	25661	38010	200065	392586	759378	0.250	12.0	2.00	4.00	8.00

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FORM VI GC/MS SEMI VOA BY INTERNAL STANDARD - INITIAL CALIBRATION DATA RESPONSE AND CONCENTRATION

Analy Batch No.: 271208 Heated Furge: (Y/N) N Calibration ID: 25393 Calibration End Date: 10/26/2015 22:31 GC Column: RXI-5811 MS ID: 0.25 (mm) Job No.: 480-89467-1 Calibration Start Date: 10/26/2015 19:36 Lab Name: TestAmerica Buffalo Instrument ID: HP5973V

ANALYTE	SI	CURVE			RESPONSE				CONCEN	CONCENTRATION (MS/UL	G/UL)	
	REF	TYPE	LVL 1 LVL 6	LVL 2 LVL 7	E TAT	LVL 4	LVL S	LVL 1 LVL 6	LVL 2 LVL 7	EVL 3	LVL 4	S TAT
Indene	NPT	Ave	21652	9843.53	174763	347395	674228	10.250	12.0	2.00	4+00	8.00
4-Nethylphenol	DCB	Ave	10520	524346	19216	182133	364579	0.850	12.0	2.00	4.00	8.00
N-Nitrosodi-n-propylamine	DCB	Ave	7097	356933	\$65E3	119530	233533	0.250	12.0	2.80	4.00	8.00
Acetophenone	BOG	Ave	15516	63212	133228	254117	498470	0.250	1,00	2,00	00'5	8.00
Hexachloroethane	008	Ave	5319	21693	46371	90745	183426	10.0	12.00	2.00	4.00	8.00
Nitrobenzene	NET	Ave	11587	45370	7707£	191304	382433	10.0	12.0	2.00	4.00	8,00
Isophorone	NPT	Ave	20754	76966	156114	305839	658113	0.250	1,00	2.00	4,00	8.00
2, 4-Dimethylphenol	MPT	Ave	11178	45646	37727	185776	364377	10.0	12.0	2.00	4.00	8.00
2-Nitrophenol	TAN	Linl	5607	326378	28655	111071	222452	10.0	12.0	2.00	4.00	8.00
Benzóic acid	NPT	hini	364849	23477	58995	136945	230622	10.0	1,00	2.00	4,00	8.00
Ble(2-chlotoethoxy)methane	LAN	Ave	14119	53445	112355	207286	409991	0.250	1.00	2.00	4.00	8.00
2,4-Dichlorophenol	NPT	Ave	388483	39093	84430	162670	317621	0.250	12.0	2.00	4.00	8.00
1, 2, 4-Trichlorobenzene	NPT	Ave	11619	540148	93755	185385	369989	10.0	12.00	2.00	4.00	8.00
Naphthalene	NPT	Ave	1340025	1568285	297039	579289	1113754	10.0	1.00	2.00	4.00	8.00
4-Chloroaniline	TAN	Ave	18872	74214	154520	305002	622899	0.250	1.00	2.00	4.00	8.00
2, 6-Dichlorophenol	NPT	Ave	10107	470975	81972	163276	317064	10.0	1.00	2.00	4.00	8.00
Hexachlorobutadiene	NPT	Ave	6769	328484	55435	109813	219810	0,250	1.00	3.00	4.00	8.00
Caprolactam	MPT	Lini	2514	13089	29992	60365	132195	0.250	12.0	5,00	4,00	8,00
4-Chloro-3-methylphenol	NPT	Ave	8604	35727	77919	160915	323820	10.0	12.00	2.00	4.00	8.00
2-Methylnaphthalene	NPT	Ave	24784	95718	201453	378930	756269	0.250	1.00	2.00	4.00	B.00
1-Methylnaphthalene	NPT	Ave	23070	1018743	184967	348435	699340	0.250	12.0	2,00	9,00	8.00

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FORM VI GC/NS SEMI VOA BY INTERNAL STANDARD - INITIAL CALIBRATION DATA RESPONSE AND CONCENTRATION

Analy Batch No.: 271208 Heated Purge: (Y/N) N Calibration ID: 25393 Calibration End Date: 10/26/2015 22:31 GC Column: RXI-5Sil MS ID: 0.25 (mm) Job No.: 480-89467-1 Calibration Start Date: 10/26/2015 19:36 Lab Name: TestAmerica Buffalo Instrument ID: HP5973V

ANALYTE	ST	CURVE			RESPONSE				CONCEN	CONCENTRATION (NG/UL)	3/nr)	
	REF	TYPE	DVL 1 DVL 6	LVL 2 LVL 7	EVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	EWL 3	LVL 4	S TAT
Hexachlorocyclopentadlene	ANT	Lini	335313	31,985	18969	135314	276421	10.0	12.0	2.00	4+00	8.00
1, 2, 4, 5-Tetrachiorobenzene	ANT	Ave	10741	42272	87802	169899	343345	10.0	12.00	2.00	4.00	8.00
2, 4, 6-Trichlorophenol	AMT	Ave	5359	26445	56430	121673	243474	0.250	12.0	2.88	4.00	8.00
2,4,5-Trichlorophenol	AMT	Aye	313483	26627	62975	125691	255986	0.250	1,00	2,00	4,00	8.00
Biphenyl	AMT	Ave	29720	1325486	232029	460268	916430	10.0	12.0	2.00	4.00	8.00
2-Chloronaphthalene	AMT	Ave	23406	1030123	180087	347985	697141	0.250	12.0	2.00	4.00	8.00
2-Wittoaniline	ANT	Lani	5357	345725	55152	111185	229034	10.0	12.0	2.00	4,00	8,00
Dimethyl phthalate	AM	Ave	24077	3159026	205069	406468	796546	10.0	12.0	2.00	4.00	8.00
1, 3-Dinitrobenzene	TAN	Linl	3352	15631	35456	74289	153529	10.0	12.0	2.00	4.00	8.00
2, 6-Dinitrotoluene	AMT	Lini	244074	22859	47053	97445	193606	0.250	1,00	2.00	4,90	8.00
Acenaphthylene	ANT	Ave	1377176	135435	293922	298565	1157227	0.250	1.00	2.00	4.00	00.8
3-Nitroaniline	ANT	Lini	5817	24369	57145	112192	228803	10.0	12.00	2.00	4.00	8,00
2,4-Dinitrophenol	ANT	Linl	4381	22986	555593	121784	261871	0.500	24.0	4.00	8,00	16.0
4-Nitrophenol	ANT	Lini	5342	326290	51602	105234	217266	20.0	24.0	4.00	8,00	16.0
Acenaphthene	AMT	Ave	22,934	1045030	187251	373324	723219	10.0	1.00	2.00	4,00	8.00
2,4-Dimitrotoluene	AMT	Linl	5912	392263	63598	128470	258677	10,0	1.30	2.00	4.00	8.00
Díbenzofuran	ANT	Ave	1217943	127787	269310	525786	1004593	19.0	1.00	3.00	4.00	8.00
2, 3, 4, 6-Tetrachlorophenol	ANT	rarı	5078	320430	50112	105522	213136	10.0	12.0	5.00	4,00	8,00
Hexadecane	PHN	Ave	22102	87235	181848	361725	687547	10.0	12.0	2.00	4.00	8.00
Diethyl phthalate	AMT	Lini	149818	230856	341075	534743	136956	10.0	1.00	2.00	4.00	8.00
4-Chlorophenyl phenyl ether	AMT	Ave	12231	49964	105468	202904	409050	0.250	12.00	2.00	9,00	8.00

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FORM VI GC/MS SEMI VOA BY INTERNAL STANDARD - INITIAL CALIBRATION DATA RESPONSE AND CONCENTRATION

Analy Batch No.: 271208 Z Calibration ID: 25393 Heated Purge: (Y/N) 22:31 ID: 0.25 (mm) Calibration End Date: 10/26/2015 RXI-5811 MS Job No.: 480-89467-1 GC Column: 19:36 10/26/2015 Lab Name: TestAmerica Buffalo Calibration Start Date: Instrument ID: HP5973V

FORM VI GC/MS SEMI VOA BY INTERNAL STANDARD - INITIAL CALIBRATION DATA RESPONSE AND CONCENTRATION

SDG No.:	Job No.: 480-89467-1	Analy Batch No.: 2/1208
nstrument ID: HP5973V	GC Column: RXI-5811 MS ID: 0.25 (mm)	Heated Purge: (Y/N) N

ANALYTE	SI	CURVE			RESPONSE				CONCEN	CONCENTRATION (NG/DL)	G/UL)	
	REF		LVL 1 LVL 6	LVL 2 LVL 7	EVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2 LVL 7	LVL 3	LVL 4	EVL S
3,3'-Dichlorobenzidine	CRY	Lini	11672	52126	118765	217694	481463	0.250	1,00	2.00	4+00	8.00
Benzo[a]anthiacene	CRN	Ave	1462365	149745	307795	606175	1201812	10.0	12.00	2.00	4.00	8.00
Chrysene	CRY	Ave	34732	142085	290181	577733	1123552	0.250	1.00	2.88	4.00	8.00
Di-m-octyl phthalate	CRY	Lini	37932	174952	378695	785504	1559275	0.250	1.00	2,00	4,00	8.00
Benzo[b] Eluoranthene	289	Lini	35589	151754	317985	651356	1277411	10.0	12.0	2.00	4.00	8.00
Benzo[k] fluoranthene	PRY	Lini	36510	158427	334206	657532	1292985	10.0	12.0	2.00	4.00	8.00
Benzo[a]pyrene	PRY	Land	32523	142626	305871	620563	1238011	0,250	1,00	2.00	4,00	8.00
Indenoil, 2, 3-cdipyrene	PRY	LinI	38119	269234	350520	711678	1425535	10.0	12.0	2.00	4.00	9,00
Dibenz(a, h) anthracene	PRY	Lini	31788	184859	303198	609524	1220253	10.0	12.0	2.00	4.00	8.00
Benzolg, h, ilperylene	PRY	Ave	32199	142605	288960	567309	1113320	10.0	1,00	2.00	4,00	8.00
2-Fluorophenol (Surr)	DCB	Ave	10684	42580	87315	176681	355551	0.250	1.00	2.00	4.00	8.00
Phenol-d5 (Surr)	DCB	Ave	13007	52283	111583	217393	433281	10.0	1,00	2.00	4.00	8.00
Nitrobenzene-d5 (Surr)	NPT	Ave	11851	49618	105631	202200	418958	10.0	12.0	2.00	4.00	8.00
2-Fluoroblphenyi	ANT	Ave	27189	1200036	210643	408771	816345	0.250	1.00	2.00	4.00	8.00
2,4,6-Tribromophenol (Surr)	NED	Ave	4341	18381	40641	81608	165543	0.250	1.00	2.00	4+00	8.00
p-Terphenyl-dl4 (Surr)	CHY	Ave	29185	1385466	243582	481262	947175	0.250	1.30	2.00	4.00	8.00

Curve Type Legend: Ave = Average ISTD Page 211 of 326

FORM VI GC/MS SEMI VOA BY INTERNAL STANDARD - INITIAL CALIBRATION DATA CURVE EVALUATION

Lab Name: TestAmerica Buffal	rica Buffalo		Job No.: 480-89467-1	Analy Batch No.: 270613
SDG No.:				
Instrument ID; HP5973X	3973X		GC Column: EXI-5811 MS ID: 0.25 (mm)	Heated Purge: (Y/N) N
Calibration Start Date: 10/23/	Date: 10/23/2015 08:33	08:33	Calibration End Date: 10/23/2015 10:48	Calibration ID: 25373

EVEL:	LAB SAMPLE ID:	LAB FILE ID:
evel 1	10 480-270613/3	X009013899.D
evel 2	IC 480-270613/4	1.00e013e00x
evel 3	ICIS 480-270613/5	XXX09013901.D
Level 4	IC 480-270613/6	%009013902.D
evel 5	IC 480-270613/7	X009013903.D
evel 6	IC 480-270613/8	X009013384.D

ANALYTE			R R H			CURVE	0	COEFFICIENT	e MIN SE	RRE 8RSD	itti	as .	P40	MIN R'2
	LVL 1 LVL 6	EVE 2	EVL 3	EVL 4	LVL 5	TYPE	m	MI M2			NG.	aksd ok	COD	OR COD
1,4-Dloxane	0.5841	0.6231	0,6987	0.6493	0.6230	Ave		0.6195		67	8	20.0		
N-Witrosodimethylamine	0.7520	0.7196	0.6976	0.7361	0.7109 Ave	Ave		0.7217		2,7		20.0		
Pyridine	1.3173	1,3014	1.2673	1.3189	1.2916 Ave	Ave		1,2984		□ &		20.0		
Benzaldehyde	0.4617	0,4880	0.4957	0,5555	0.5413 Lini	T.	-0.562	0.5408	0.0100	00		0,9980	086	0066'0
Phenol	1.8269	1.8130	1.7280	7.7592	1.7507	Ave		1.7674	0.8000	0.0		20.0		
Aniline	2,1279	2.1887	2.1146	2,1835	2,1554	Ave		2,1135		(r)		20.0		
Bis(2-chloroethyl)ether	1.4336	1.4621	1,3823	3,4320	1,4146	Ave		1,4227	0.7000	00 1.9		20.0		
2-Chlorophenol	1.4881	1.4549	1.4329	1,4613	1.4446	Ave		1,4523	0.8000	00 1.5		20.0		
n-Decane	1.9241	1.8465	1.7319	1.7547	1,7540	Ave		1.7869	0,0100	90 4.6		20.02		
1, 3-Dichlorobenzene	1.5989	1.5355	1.5424	1.5670	1,5475	Ave		1,5578		1.5		20.0		
1, 4-Dichlorobenzene	1.5305	1.6180	1.5688	1.6027	1.5756 Ave	Ave	Ì	1,5933		1.1		20.0		
Benzyl alcohol	0.9268	0.4363	0.9156	0.9468	0.9287	Ave		0.9222		2.6		20.0		
1,2-Dichlorobenzene	1,5771	1,4873	1.4590	1,4869	1.4680	Ave		1.4889		(r)	1	20.0		
2-Methylphenol	1.2847	1.2773	1.2392	1.2791	1,2812	Ave		1,2713	0.7000		i i	20.02		
bis (2-chloroiscpropyl) ether	1.7580	1.9551	1,7997	1,8252	1.8204	Ave		1.8661	0.0100	00 5.7		20.0		

Note: The mi coefficient is the same as Ave RRF for an Ave curve type.

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FORM VI 8270D

FORM VI GC/MS SEMI VOA BY INTERNAL STANDARD - INITIAL CALIBRATION DATA CURVE EVALUATION

Lab Name: TestAmerica Buffalo SDG No.:	falo		Job No.:		480-89467-1	H			A	Analy Batch No.:	atch N		270613		1
Instrument ID: HP5973X			GC Column:	100	RXI-5Sil	MS	ID: 0.25	0.25 (mm)	I	Heated	Furge:	(X/N)	z		
Calibration Start Date: 10/23	0/23/2015 08:	69	Calib	Calibration	End Date:	e: 10/	10/23/2015	10:48	D	Calibration		ID: 25373	873		
ANALYTE			50 (8)		3	CURVE	00	COEFFICIENT	9	MIN RRE	*RSD #	MAX	2V2	WIN #	N R^2
	LVL 1 LVL 6	EAR 3	LVL 3	LVL 4	TAT 2	TYPE	В	KI NZ				SRSD	OR COD	OB OB	a cop
Indene	0.8133	0.7833	0.7876	0.7706	0.7560 4	Ave	0	0.7740			9.0	20.0			
4-Methylphenol	1.3361	1.3397	1.2851	1.3155	1.8137 F	Ave	7	1.3148		0.6000	1.7	20.0			
N-Nitrosodi-n-propylamine	0.9750	0.9909	0.9376	0.9840	0.9713 2	Ave	0	0.9726		0.5000	D: 0	20.0			
Acetophenone	1.9756	1.9208	1.7901	1,8262	1.8287	Ave	H	1.8577		0.0100	4.0	20.0			
Hexachloroethane	0.6213	0.6019	0.6025	0.6185	0.6118 7	Ave	0	0.6118		0.3000	1.3	20.0			
Nitrobenzene	0.3851	0.3770	0,3741	0,3838	0.3710 #	Ave	0	0.3772		0.2000	1.6	20.0			
Isophorone	0.6826	0.6762	0.6698	0.6766	0.6592	Ave	0	0.6697		0.4000	1.7	20.0			
2-Nitrophenol	0,1800	0.1863	0.2013	0.2077	0.1994	Lin1	0.158 0	0.2042		0.1000			0566 '0	α.	0,066.0
2, 4-Dimethy Lphenol	0.3599	0.3677	0,3637	0,3723	0.3590	Ave	0	0.3637		0.2000	1.5	20.0			
Benzoic adid	0.2088	0.2293	6.0	0.3177	0.2716 1	Lini	-0.476 0	0.2775	H				0.9990	0	0.9900
Bis(2-chloroethoxy)methane	0.4399	0.4288	0.4225	0.4284	0.4170	Ave	Ö.	0.4257		0.3000	2.0	20.0			
2, 4-Dichlorophenol	0.2961	0,3068	0,3018	0,3102	0.3005 7	Ave	0	0.3032		0.2000	1.6	20.0			
I, 2, 4-Trichlorobenzene	0.3369	0.3313	0.3302	0.3399	0.3234 7	Ave	0	0.3317			1.6	20.0			
Naphthalene	1.0780	1.0538	1,0041	0.9735	0.9489	Ave	0	9799.0		0.7000	av.	20.0			
4-Chloroaniline	0.3996	0.4404	0.4521	0.4589	0,4434 7	Ave	0	0.4395		0.0100	4	20.0			
2, 6-Dichlorophenol	0.2975	0,2998	0.2983	0.3049	0.2987	Ave	0	0.2992			T.0	20.0			
Hexachlorobutadiene	0,1895	0.1852	0.1384	0,1906	0.1865 2	Ave	0	0,1875		0,0100	1.2	20.0			
Caprolactam	0.1044	0.1098	0.1144	0.1214	0.1146 1	Lini	-0.072 0	0.1168		0.0100			0666'0	0	0066.0
4-Chloro-3-methylphenol	0.2951	0.3019	0.3013	0.3129	0.3033 /	Ave	O	0.3038		0.2000	2.0	20.0			
2-Methylnaphthalene	0.6982	0.6767	0.6643	0.6689	0.6478 7	Ave	0	0.6663		0.4000	eri eri	20.0			

Note: The mi coefficient is the same as Ave RRF for an Ave curve type.

ECRM VI 8270D

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FORM VI GC/MS SEMI VOA BY INTERNAL STANDARD - INITIAL CALIBRATION DATA CURVE EVALUATION

SDG No.:													
Instrument ID: HP5973X			GC Column:		RXI-5811	MS ID:	: 0.25 (mm)	mm).	Heated	ed Fur	Furge: (Y/N)	N (N	
Calibration Start Date: 10/23/2015	08	60	Calib	Calibration	End Date:		10/23/2015	10:48	Cali	Calibration	ij	25373	
ANALYTE			50 (8)		0	CURVE	COEF	COEFFICIENT	# MIN BRE	RRE WRSD	MAX # G	F.	# MIN RYZ
	LVL 1 LVL 6	LVL 2	EVL 3	LVL 4	TAT 2	TYPE	В	MI MZ			8.8.8 3.8.8	D OR COD	OR COD
1-Nethylnaphthalene	0.6162	0.6259	0.6649	0.6103	0.5926 Ave	ve	9.0	0,6059	0.0	0.0100 2	2.5 20.0	0.	
Hexachlorocyclopentadiene	0.4281	0.4242	0.4283	0.4452	0.4356 1	Lin1 -0	-0.174 0.4	0.4362	0.0	0.050.0		1.0000	0.9900
1, 2, 4, 5-Tetrachlorobenzene	0.5578	0.5790	0.5521	0.5714	0.5553 #	Ave	0.5	0.5602	0.0	0.0100 2	2.2 20.0	0.	
2, 4, 6-Trichlorophenol	0.3915	0.3790	0.3902	0.4146	D.3961 I	Lin1 -0	-0.119 0.4	0.4009	0.2	0.2000		0,9990	0.9900
2,4,5-Trichlorophenol	0.4049	0.4084	0.4087	0.4287	0.4199 1	Lini -0	-0.119 D.4	0.4207	0.2	0.2000		1,0000	0066.0
Biphenyl	1.4395	1,4599	1,3874	1,3773	I.3423 A	Ave	1.3	1,3888	0.0	0.0100	3.8 20.0	0.	
2-Chloronaphthalene	1.1749	1,2056	1.1408	1,1590	1.1205 P	Ave	1.3	1.1511	0.8	0.8000 3	3.2 20.0	0	
Z-Nitroantline	0.3827	0.3427	0.3465	0,3619	0.2539 1	Lini -0	-0.199 0.3	0.3570	0.0	0.010.0		J. 0000	0,9900
Dimethyl phthalate	1,2855	1,3381	1,2832	1,2882	1.2474 4	Ave	1.2	1.2784	0.0	0.0100 3.	3.00 20	20.0	
I, S-Dinitrobenzene	0.0963	0.1093	0.1198	0.1304	0.1244 1	Lini -0	-0.199 0.1	0.1277				0.3950	0.9900
2, 6-Dinitrotaluene	0.2704	0.3112	0.3136	0.3294	0.3157 1	Lin1 -0	-0.253 0.3	0.3226				1,0000	0,3900
Acenaphthylene	1,7771	1.8131	1,7203	1,7029	I,6492 A	Ave	1.7	1,7118	6,0	0,9000 4	4,5	20.0	
3-Nitroamiline	0.3013	0.3395	0.3479	0.3633	0.3508 1	Lini -0	-0.286 0.3	0,3568	0.0	0.010.0		1,0000	0.9900
Acenaphthene	1.1329	1.1322	1.0667	1,0656	1.0447 Ave	ve.	1.0	1.0764	0.0	0.9000 4	4.4	20.0	
2,4-Dinitrophenol	0.1272	0.1585	0.1796	0.1975	0.1922 I	Lin1 -0	-0.860 0.1	0,1963	0.0	0.0100		0566'0	0,9900
4-Nitrophenol	0.1557	0,1731	0.1762	0.1833	0.1788 1	Lin1 -0	-0.253 0.3	0.1805	0.0	0.0100		1,0000	0.8900
2,4-Dinitrotolvene	0,3678	0,4056	0.4071	0.4398	0.4226 1	rin1 -0	-0.340 0.4	0,4279	0.2	0,2000		066610	0066'0
DibenzoEutan	1.6847	1.6785	1,5859	1,5559	1.5062 A	Ave	1.5	1.5834	0.8	0.8000 5	5.3 20.0	0	
2, 3, 4, 6-Tetrachlorophenol	0.2718	0.3059	0.3181	0.3293	0.3149 1	Lini -0	-0.286 0.3	0.3246	070	0,010,0		1,0000	0,8900
Diethyl phthalate	1.2244	1.2732	1.2266	1,2300	1.1919 Ave	We	1.2	1.2138	0.0	0.0100 3	3.0 20	20.0	

Note: The mi coefficient is the same as Ave RRF for an Ave curve type.

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FORM VI GC/MS SEMI VOA BY INTERNAL STANDARD - INITIAL CALIBRATION DATA CURVE EVALUATION

SDG No.:	SDG No.:											
Instrument ID: HP5973X			GC 160	Column: B	RXI-5811 MS	ID:	0.25 (mm)	Heated	Furge:	(X/N) :	N	
Calibration Start Date: 10/23	0/23/2015 08	69	Calib	Calibration	End Date:	10/23/201	315 10:48	Calibration		ID: 25	25373	
ANALYTE			50 50 (#)		CURVE		COEFFICIENT	4 MIN BRE	*RSD	# MAX	50	
	LVL 1 LVL 6	LVL 2	EVL 3	LVL 4	LVL 5 TYPE	a	MI MZ			BRSD	OR COD	OR COD
Hexadecane	0.9659	0.9359	0.8955	0,8686	0,8434 Linl	0.9657	0.8403	0.0100			0666'0	0,9900
4-Chlorophenyl phenyl ether	0.6270	0.6533	0.6418	0.6514	0.5273 Ave		0.6446	0.4000	2.4	20.0		
4-NitroanLine	0.3545	0.3451	0.3489	0.3641	0,3520 Linl	-0.101	0.3571	0.0100			1,0000	0066'0
Fluorene	1.1933	1,3373	1,2601	1,2581	1,2290 Ave		1.2651	0.9000	4.2	20.0		
4,6-Dinitro-2-methylphenol	0.1110	0.1367	0.1600	0.1702	0.1634 Lin1	-0.676	0.1678	0.0100			0.9990	0066.0
Diphenylamine	0.59113 7193.0	0.6862	0,6552	0.6232	0.6140 Ave		0.6469		7.1	20.0		
N-Nitrosodiphenylamine	0.6082	0.5867	0.5602	0.5328	0.5250 Ave		0.5531	0.0100	7.3	20.0		
1,2-Diphenylhydrazine	1,2728	1.2872	1,2251	1,2448	1.2024 Ave		1.2350		62	20.0		
trans-Azobenzene	0.7947	0.7890	0.7679	0,7696	0.7480 Ave		0.7660	*	en en	20.0		
4-Bromophenyl phenyl ether	0.2336	0.2319	0.2313	0.2339	0.2325 Ave		0.2333	0.1000	1.5	20.0		
Hexachlorobenzene	0.2439	0.2449	0.2411	0.2501	0.2429 Ave		0.2443	0.1000	1.3	20.0		
Atrazine	0.3708	0,3670	0,3675	0.3783	0,3623 Linl	0,0662	0,3636	0.0100			0666'0	0066'0
Pentachl orophenol.	0.1009	0.1156	0.1338	0.1430	D.1418 Lini	-0.571	0.1440	0.0500			0.9990	0.9900
n-Octadecane	0.5258	0.5788	0.5685	0.5547	0.5432 Ave	Į	0.5630	0,0100	2.0	20.0		
Phenanthrene	1.2325	1.1733	1,1074	1.0419	1,0354 Linl	1.6028	1.0166	0.7000			0.9980	0066"0
Anthracene	1.1986	1.1719	1.1064	1.0531	1.0470 Linl	1.3604	1.0278	0.7000			0.9980	0.3900
Carbazole	1,1306	1,1311	1,0579	1,0039	1.0082 Ave		1.0468	0,0100	0.7	20,0		
Di-n-butyl phthalate	1,2591	1.2942	1.2445	1,1452	1.1528 Ave		1,1962	0.0100	6.9	20.0		
Fluoranthene	1.2526	1,2754	1.1903	1.1240	1.1607 Ave		1.1710	0.5000	7.1	20.0		
Benzidine	0,4619	0.3452	0.4154	0,4720	0.4471 Linl	-2.204	0.4776				0566+0	0066+0

Note: The mi coefficient is the same as Ave RRF for an Ave curve type.

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FORM VI GC/MS SEMI VOA BY INTERNAL STANDARD - INITIAL CALIBRATION DATA CURVE EVALUATION

SUG NO.:														
Instrument ID: HP5973X			GC Column:		RXI-5811	MS ID:	1: 0.25 (mm)	(mm)	Hes	Heated F	Furge:	(X/X)	Z	
Calibration Start Date: 10/23	3/2015 08	60	Calib	Calibration	End Date:		10/23/2015	3 10:48	Ca	Calibration		ID: 25373	73	
ANALYTE			(A)		0	CURVE	COE	COEFFICIENT	M. WI	MIN BRE	*RSD *	MAX	R/2	
	LVL 1 LVL 6	Z TAT	LVL 3	LVL 4	LVL 5	TYPE	В	KI N2				RESD	OR COD	OR COL
Pyrene	1.0557	1.2305	I.1685	1.1349		Ave	1,	1.1504	0	0.6000	rt.	20.0		
Butyl benzyl phthalate	0.5480	70	0.5655	0.5871	0.5552 L	Lin1 -(-0.018 0.	0.5613	0	0.0100	h		0.9990	0.9900
Bis(2-ethylhexyl) phthalate	0.7578	0.8018	0.8039	0.8093	0.1774 L	Lini 0.	0.1840 0.	0.77.99	0	0.0100			0.9990	0066'0
3, 3'-Dichlorobenzidine	0.4317	0.4453	0.4299	0.4503	D.4333 L	Lin1 -(-0.083 0.	0.4377	6	0.0100			06660	0.9900
Benzo[a]anthracene	1.1732	1,1988	1.1416	1.1324	1,0802 A	Ave	1,	1,1309	0	0.8000	4.3	20.0		
Chrysene	1,1639	1,1346	1,0726	1,0540	I.0239 A	Ave	Ä	1.0745	0	0.7000	0.9	20.0		
Di-n-octyl phthalate	1.2456	1.3785	1.3402	1.3196	1.2985 L	Lini 0.	0.7016 I.	1.2852	0	0.0100			0.9990	0.9900
Benzo [b] Euoranthene	1,1320	1.2021	1.2355	1,2451	T SEEL'E	Lin1 0.	0.1716 1.	1,1715	0	0.7000			0,5970	0066'0
Benzo[k]fluoranthene	1,2739	1,2260	1,1662	1,2031	1,2554 A	Ave	ř	1.2150	0	0.7000	F-	20.0	i	
Benzo[a]pyrene	1.1311	1.1286	1.1126	1.1472	1.1173 A	Ave	H	1.1223	10	0.7000	(g . f)	20.0		
Dibenz(s,h)anthracene	1.0495	1.0803	1,0803	1,1085	I.1026 A	Ave	÷	1.0815			2.0	20.0		
Indena[1, 2, 3-cd]pyrene	1,2628	1.2758	1.2576	1,2846	I.2833 A	Ave	÷	1,2691	0	0.5000	1:1	30.0		
Benzolg, h, 1]perylene	1.0257	1,0593	1.0468	1.0723	1.0739 A	Ave	Ċ.	1,0542	0	0.5000	<i>i</i> ~.	20.0	Ī	
2-Fluorophenol (Surr)	1,4473	1.4461	1,4252	1.4878	1,4365 A	Ave	i.	1.4503			5.5	20.0		
Phenol-d5 (Surr)	1.6946	1,7052	1,6626	1.7123	1.7084 A	Ave	T.	1.6958			11	20.0		
Nitrobenzene-d5 (Surr)	0.3699		0.3835	0.3914	0.3785 A	Ave	0	0.3798			ĕ. ⊟	20.0		
2-Fluogobiphenyl	1,3658	1.3787	1,3261	1,3237	1.2781 A	Ave	i	1.3214			E	20.0		
2, 4, 6-Tribromophenol (Surr)	0.1166	0.1118	0.1164	0,1249	0.1212 L	Linl -(0.063 0.	0.1219					066610	0066'0
p-Terphenyl-d14 (Surr)	0.8522	0.8524	0.8434	0.8504	D.8105 A	Ave	0	0.8371			2.9	20.0		

Note: The mi coefficient is the same as Ave RRF for an Ave curve type.

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FORM VI GC/MS SEMI VOA BY INTERNAL STANDARD - INITIAL CALIBRATION DATA RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Buffalo	Wffalo	Job No.: 480-89467-1	Analy Batch No.: 270613
SDG No.:			
Instrument ID: HP5973X		GC Column: RXI-5811 MS ID: 0.25 (mm)	Heated Furge: (Y/N) N
Calibration Start Date: 10/23/	10/23/2015 08:33	Calibration End Date: 10/23/2015 10:48	Calibration ID: 25373

DEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	IC 480-270613/3	T.000013899.D
Level 2	IC 480-270613/4	X009013900.D
Level 3	ICIS 480-270613/5	X009013901.D
Level 4	IC 480-270613/6	X009013902.D
Level 5	IC 480-270613/7	X009013903.D
Level 6	IC 480-270613/8	X009013904.D

ANALYTE	IS	CURVE			RESPONSE				CONCEN	CONCENTRATION (N	(NG/QT)	
	R N	TYPE	DVL 1 DVL 6	EVL 2	LVL 3	LVL 4	TAT 8	LVL 1 LVL 6	DVL 2	LVL 3	LVL 4	IVL 5
.,4-Dioxane	DCB	Ave	26028	96760	323288	527812	461418	3,00	20.0	50.0	80.0	100
N-Nitrosodimethylamine	DCB	AVE	33508	331760	370461	598314	526494	5.00	20.0	50.0	80.08	100
Pyridine	DCB	Ave	1160491	202102	673015	1072059	956592	8.00 120	20.0	50.0	80.0	100
Benzaldehyde	DCB	Linl	20573	75791	263275	451536	400922	9,00	20.0	0.00	80.0	100
Phenol	DCB	Ave	31406	281553	917689	1425038	1296602	5:00	20.0	20.0	0.08	100
Ancline	DCB	Ave	1908376	339903	1123007	1774802	1596404	120	20.0	50.0	80.0	100
Bis(2-chlorosthy1)ether	DCB	Ave	53883	227063	734103	1163983	1047679	5.00	20.0	50.0	80.0	100
2-Chlorophenol	DCB	Ave	66313	225941	760957	1187814	1069946	\$200	20.0	50.0	80.0	100
n-Decane	DCB	Ave	1534003	286760	919787	1426319	1299045	3,00	20.0	20.0	0,08	100
1, 3-Dichlorobenzene	DCB	Ave	71250	241570	819113	1273742	1146125	5.00	20.0	50.0	80.0	100
1, 4-Dichlorobenzene	DCB	Ave	1402581	251278	833130	1302724	1156951	5.00	20.0	20.0	80.0	100
Benzyl alcohol	DCB	Ave	39172	145411	486244	169630	687855	120	20.0	20.0	90.08	100
1, 2-Dichlorobenzene	DCB	Ave	1305174	230983	774824	1208651	1087242	120	20.0	50.0	80.08	COL
2-Methylphenol	DCB	Ave	57249	198428	658093	1039690	948909	5.00	20.0	50.0	80.0	100
bis (2-chloroisopropyl) ether	DCB	Ave	1576661	303628	955755	1483633	1348279	3,00	20.0	50.0	0,08	100
Indene	NHA	Ave	2374384	404157	1312344	2024784	1846365	\$.00	20.0	50.0	80.0	100

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FORM VI 8270D

FORM VI GC/MS SEMI VOA BY INTERNAL STANDARD - INITIAL CALLERATION DATA RESPONSE AND CONCENTRATION

SDG No.:	Job No.: 480-89467-1	Analy bacon No.: 270513
Instrument ID: HP5973X	GC Column: RXI-5Sil MS ID: 0.25(mm)	Heated Furge: (Y/N) N
Calibration Start Date: 10/23/2015 08:33		

ANALYTE	SIS	CURVE			RESPONSE				CONCEN	CONCENTRATION (NG/UL	G/UL)	1
	No.	TYPE	LVL 1 LVL 6	LVL 2	EVL 3	LVL 4	TAP 2	LVL 1 LVL 6	LVL 2	LVL 3	LVL 4	S TAT
4-Methylphenol	DCB	Ave	59536	208059	682486	1072575	972947	3,00	30.0	20.0	80.0	100
N-Nitrosodi-n-propylamine	DCB	Ave	43445	153882	497919	799796	719415	120	20.0	20.0	80.0	100
Acetophenone	DCB	Ave	1618719	298286	950675	1484396	1354381	5.00	20.0	50.0	80.0	100
Hexachloroethane	DCB	Ave	27687	93482	319980	502779	453121	120	20.0	50.0	80.0	100
Nitrobenzene	TAN	Ave	1249016	218146	714677	1140879	1035010	5.00	20.0	20.0	80.0	TOU
Isophorone	NET	Ave	114040	392333	1279375	2011035	1838853	3,00	20.0	50.0	80.0	100
2-Nitrophenol	NPT	Lini	30068	108114	384512	617358	556329	3,00	20.0	20.0	0.08	100
2, 4-Dimethylphenol	NPT	Ave	1206796	213347	694705	1106536	1001411	5.00	20.0	50.0	0.08	100
Benzoic acid	TAN	Lini	54887	133060	488780	825387	757755	5.00	20.0	50.0	0.08	00T
Bis(2-chloroethoxy)methane	NPT	Ave	73499	248786	807033	1273553	1163286	5,00	20.0	50,0	0.08	100
2, 4-Dichlerophenol	TAN	Ave	1019524	178041	576541	922108	361888	3.00	20.0	50.0	80.0	100
1, 2, 4-Trichlorobenzene	NPT	Ave	1099672	192467	630642	1010336	902070	5,00	20.0	20,0	80,08	100
Naphthalene	NPT	Ave	3109464	611471	1917973	2893580	2646999	9,00	20.0	20.0	80.08	100
4-Chloroaniline	NET	Ave	66761	255539	863498	1364178	1236930	5.00	20.0	50.0	80.0	100
2, 6-Dichlorophenol	TAN	Ave	49703	173965	569863	906242	B3328I	5.00	20.0	50.0	0.08	100
Hexachlorobutadiene	NPT	Ave	31660	107446	329866	566432	520374	5.00	20.0	50.0	80.0	100
Caprolactam	NPT	Lini	17448	63703	218559	360730	319695	120	20.0	20.0	0.08	TOOT
4-Chloro-3-methylphenol	MPT	Ave	49312	178667	575572	928835	8461.44	3,00	20.0	50.0	80 0	100
2-Nethylnaphthalene	NPT	Ave	116652	392664	1269005	1988386	1807015	5.00	20.0	0.00	80.0	100
1-Methylnaphthalene	TAN	Ave	102947	363186	1155500	1814599	1653063	5.00	20.0	50.0	0.08	100
Hexachlorocyclopentadlene	AMT	Lini	36754	134160	447486	724833	1641391	3,00	20.0	50.0	80.0	100

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FORM VI GC/NS SEMI VOA BY INTERNAL STANDARD - INITIAL CALIBRATION DATA RESPONSE AND CONCENTRATION

Analy Batch No.: 270613 Heated Purge: (Y/N) N Calibration ID: 25373 Calibration End Date: 10/23/2015 10:48 GC Column: RXI-5811 MS ID: 0.25 (mm) Job No.: 480-89467-1 08:33 Calibration Start Date: 10/23/2015 Lab Name: TestAmerica Buffalo Instrument ID: HP5973X

ANALYTE	SI	CURVE		C	RESPONSE				CONCEN	CONCENTRATION (NG/UL)	G/UI)	
	KE F	TIES	LVL 1 LVL 6	LVL 2	E TAT	LVL 4	TAP 2	LVL 1 LVL 6	INL 2	LVL 3	LVL 4	S TAT
1, 2, 4, 5-Tetrachlorobensene	ANT	Ave	50923	183137	576884	928153	843780	3,00	20.0	50.0	80.0	100
2, 4, 6-Trichlorophenel	ANT	Linl	35742	119966	407747	673483	601857	5.00	20.0	20.0	80.0	TOO
2, 4, 5-Trichlorophenol	ANT	Lini	36968	129138	427083	696476	638046	5.00 120	20.0	50.0	80.0	COT
Biphenyl	TAN	Ave	131425	461720	1449689	2237376	2039495	5,00	20.0	50.0	80.0	100
2-Chloronaphthalene	AMT	Ave	2024501	3815335	1191975	1882772	1702384	5.00	20.0	50.0	80.08	100
2-Nitroaniline	ANT	Lini	29458	108380	362052	587947	537712	3,00	20.0	50.0	80,0	100
Dimethyl phthalate	ANT	Ave	2248039	423201	1340761	2092562	1895323	3,00	20.0	50.0	0,08	100
1, 3-Dinitrobenzene	MPT	LinI	16034	63233	228826	387694	346893	320	20.0	50.0	0.08	100
2, 6-Dinitrotoluene	ANT	Lini	24683	98425	327672	535156	419670	5.00 N20	20.0	20.0	80.0	100
Acenaphthylene	AMT	Ave	162253	573438	1797472	2766371	2505,670	3,00	20.0	50.0	0.08	100
3-Nitroaniline	ANT	first	27505	107379	363472	590143	532973	3.00	20.0	50.0	80.0	100
Acenaphthene	ANT	Ave	103434	358100	1114531	1730991	1587305	5,00	20.0	20,0	0,08	100
2, 4-Dinitrophenol	ANT	Linl	23225	100286	375285	641806	584017	10,0	40.0	100	160	200
4-Nitrophenol	ANT	Lini	28425	109514	317898	595631	543369	10.0	40.0	100	160	200
2,4-Dinitrocoluene	ANT	lini	33582	128291	425401	714444	642079	5.00	20.0	50.0	80.0	100
Dibenzofuran	AMT	Ave	153810	530835	1657029	2527477	2288524	5.00	20.0	50.0	80.0	100
2, 3, 4, 6-Tetrachlorophenol	ANT	Lini	24816	96744	329266	534976	478385	5.00	20.0	20.0	0.08	TOO
Diethyl phthalate	ANT	Ave	2134812	402679	1281670	1998092	1810884	3,00	20.0	50.0	80,40	100
Hexadecane	ANT	Lini	1506174	296010	935654	1411041	1281472	5.00	20.0	0.00	80.0	100
4-Chlorophenyl phenyl ether	TWE	Ave	1147469	206621	672579	1058167	953138	5.00	20.0	20:0	80.0	100
4-Nitroanline	TAM	Lini	31441	109142	364542	591506	534757	3,00	20.0	50.0	80.0	100

FORM VI GC/MS SEMI VOA BY INTERNAL STANDARD - INITIAL CALIBRATION DATA RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1	Analy Batch No.: 270613
SDG No.:		
nstrument ID: HP5973X	GC Column: RXI-5811 MS ID: 0.25 (mm)	Heated Purge: (Y/N) N
alibration Start Date: 10/23/2015 09:33	Calibration End Date: 10/23/2015 10:48	Calibration ID: 25373

ANALYTE	SI	-			RESPONSE				CONCEN	CONCENTRATION (N	(MG/DT)	
	NE F	E E	LVL 1 LVL 6	LVL 2	E TAT	LVL 4	LVL 5	LVL 1 LVL 6	IVL 2	LVL 3	LVL 4	S TAT
Fluorene	ANT	Ave	119830	422968	1316688	2043817	1867237	3,00	30.0	50.0	80.0	100
4, 6-Dinitro-2-methylphenol	NHd	Lin	32475	141091	952336	894206	797932	10.0	40.0	100	160	200
Diphenylamine	PEIN	Ave	3000456	605432	1887740	2800101	2554523	8.55	34.2	00 00 00 00	137	171
N-Nitrosodiphenylamine	PHIV	Aye	3000456	605432	1867740	2800101	2564523	10.0	40.0	100	160	200
1, 2-Diphenylbydrazine	ANT	Ave	116210	407100	1280034	2022145	1826878	5.00	20.0	20.0	80.08	100
trans-Azobenzene	PEN	Ave	116210	407100	1280034	2022145	1826878	3,00	20.0	50.0	80,0	100
4-Bromophenyl phenyl ether	PEIN	Aye	34156	119680	385503	630244	567868	3,00	20.0	20.0	0.08	100
Hexachiorobenzene	NHA	Ave	35662	926363	401943	180159	593306	5.00	20,0	50.0	50.0	100
Atrazine	ANT	Lini	53857	116071	384042	614578	550399	5.00	20.0	50.0	80.0	100
Fentachlorophenol	PEN	Lini	29514	119308	445978	751560	692527	10.0	40.0	100	160	200
n-Octadecane	NHA	Ave	1559318	298641	947712	1457465	1326600	120	20.0	50.0	80.0	100
Phenanthrene	PHN	Tub!	180222	605382	1845939	2737775	2528797	5,00	20.0	20.0	80.0	100
Anthracene	PHN	Lin1	175275	604700	1844391	2767086	2557296	3.00	20.0	50.0	80.0	100
Carbazole	PHN	Ave	165326	583624	1763414	2637727	2462294	5.00	20.0	50.0	80.0	100
Di-n-butyl phthalate	MHd	Ave	3206091	667806	2074479	3009743	2815577	5.00	20.0	50.0	80.0	100
Fluoranthene	NEG	Ave	183159	658072	1984145	2953525	2727300	5,00	20.0	50.0	80.0	100
Benzidine	CRY	Lini	9675	194229	752428	1279927	1171556	5.00	20.0	20.0	0.08	TOOT
Pyrene	CRY	Aye	3272676	692375	2116523	3077387	2860261	120	20.0	50.0	80,08	100
Butyl benzyl phthalate	CRY	Lin1	87808	311720	1024391	1592040	1454756	\$200	20.0	50.0	80.0	100
Bis(2-ethylhexyl) phthalate	CRY	Lini	2849197	451152	1456236	2194476	2037083	5.00	20.0	50.0	80.0	100
3, 3'-Dichlorobenzidine	CRY	Lini	1 929 255	250568	778638	1221710	1135502	3,00	20.0	50.0	80.0	100

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FORM VI GC/MS SEMI VOA BY INTERNAL STANDARD - INITIAL CALIBRATION DATA RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1	Analy Batch No.: 270613
Instrument ID: HP5973X	GC Column: RXI-5Sil MS ID: 0,25(mm)	Heated Purge: (Y/N) N
Calibration Start Date: 10/23/2015 08:33	723/2015 08:33 Calibration End Date: 10/23/2015 10:48	Calibration ID: 25373

ANALYTE	SI	CURVE			RESPONSE				CONCEN	CONCENTRATION (N	(MG/DT)	
	REF	TYPE	LVL 1 LVL 6	LVL 2	EVL 3	LVL 4	LVL 5	LVL 1 LVL 6	LVL 2	FW 3	LVL 4	E TAT
Benno[a]anthracene	CRY	Ave	3282854	674516	2067914	3070619	2830358	3,00	2000	50.0	80.0	TOOL
Chrysene	CRY	Ave	3092739	638418	1942926	2857969	2682843	5.00	20.0	50.0	80.0	T00
Di-n-octyl phthalate	CRY	Lini	3861152	775601	2427667	3578121	3402521	5.00 120	20.0	50.0	80.08	100
Benzo(b)fluoranthene	PRY	Lini	171061	656217	2180983	3229871	2824695	5.00	20.0	50.0	80.0	100
Benzo[k] Fluoranthene	28.5	Ave	3530364	669248	2058669	3120973	3130900	5.00	20.0	50.0	80.0	TOU
Benzo[a]pyrene	PRY	Ave	3321924	616089	1963952	2976080	2786599	3,00	20.0	50.0	80.0	100
Dibenz(a, h) anthracene	PRY	Ave	158591	589700	1907059	2875665	2749848	3,00	20.0	50.0	80.0	100
Indenoil, 2, 3-cdjpyrene	PRY	Ave	3786598	696452	2219963	3332442	3200498	5.00	20.0	80.0	50.0	001
Benzo[g, h, i]perylene	PRY	Ave	154988	578253	1847803	2781774	2678158	5.00	20.0	20.0	80.0	100
2-Fluorophenol (Surr)	DCB	Ave	1298005	224581	756882	1209378	1063928	3,00	20.0	50.0	80.0	100
Phenol-d5 (Surr)	DCB	Ave	1517071	264812	682969	1391863	1365332	3.00	20.0	50.0	80.08	100
Nitrohenzene-da (Surr)	NPT	Ave	1271296	218477	732564	1163487	1055987	5,00	20.0	50.0	80.0	100
2-Fluonobiphenyl	ANT	Ave	124697	436044	1385559	2153634	1941884	3.00	20.0	50.0	80.0	100
2,4,6-Tribromophenol (Surr)	PHN	Lini	17043	57670	163986	328064	296054	5.00	20.0	20.0	80.0	100
p-Terphenyl-d14 (Surr)	CRY	Ave	135459	485226	1527782	2305848	2123660	5.00	20.0	50.0	80.0	100

Curve Type Legend:
Ave = Average ISTD
Lin1 = Linear 1/conc ISTD

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Lab Name: TestAmerica Buffalo Job No.: 480-89467-1

SDG No.:

Lab Sample ID (1): CCVIS 480-273506/3 Instrument ID (1): HP5973%

GC Column (1): RXI-5sil MS ID: 0.25(mm) Date Analyzed (1): 11/05/2015 10:42

ANALYTE	RT	RESOLUTION (%)
2-Fluorophenol (Surr)	5.21	100.0
Phenol-d5 (Surr)	6.34	100.0
Nitrobenzene-d5 (Surr)	7.48	100.0
Naphthalene	8,38	100.0
2-Fluorobiphenyl	9.62	100.0
Acenaphthylene	10.26	100.0
Acenaphthene	10.46	100.0
Fluorene	11.01	100.0
2,4,6-Tribromophenol (Surr)	11.25	100.0
Phenanthrene	11.96	100.0
Anthracene	12.01	100.0
Fluoranthene	13.05	100.0
Pyrene	13.26	100.0
p-Terphenyl-d14 (Surr)	13.35	100.0
Benzo[a]anthracene	14.33	100.0
Chrysene	14.36	100.0
Benzo[b]fluoranthene	15.43	36,60
Benzo[k]fluoranthene	15.46	100.0
Benzo[a]pyrene	15.84	100.0
Indeno[1,2,3-cd]pyrene	17.50	100.0
Dibenz(a,h)anthracene	17.50	100.0

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Lab Name: TestAmerica Buffalo

SDG No.:

Lab Sample ID (1): CCVIS 480-273910/3

GC Column (1): RXI-5Sil MS ID: 0.25(nm)

Date Analyzed (1): 11/09/2015 12:57

ANALYTE	RT	RESOLUTION (%)		
2-Fluorophenol (Surr)	5.73	100.0		
Phenol-d5 (Surr)	6.50	100.0		
Nitrobenzene-d5 (Surr)	7.30	100.0		
Naphthalene	7,94	100.0		
2-Fluorobiphenyl	8.81	100.0		
Acenaphthylene	9.30	100.0		
Acenaphthene	9.45	100.0		
Fluorene	9.88	100.0		
2,4,6-Tribromophenol (Surr)	10.09	100.0		
Phenanthrene	10.71	100.0		
Anthracene	10.75	100.0		
Fluoranthene	11.81	100.0		
Pyrene	12.07	100.0		
p-Terphenyl-d14 (Surr)	12.16	100.0		
Benzo[a]anthracene	13.58	100.0		
Chrysene	13.64	100.0		
Benzo[b]fluoranthene	15.30	19,20		
Benzo[k]fluoranthens	15.35	100.0		
Benzo[a]pyrene	15.86	100.0		
Indeno[1,2,3-cd]pyrene	18.05	100.0		
Dibenz(a,h)anthracene	18.06	100.0		

FORM VI 8270D

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Lab Name: TestAmerica Buffalo

SDG No.:

Lab Sample ID (1): CCVIS 480-273999/3

GC Column (1): RXI-5Sil MS ID: 0.25(mm)

Date Analyzed (1): 11/10/2015 11:07

ANALYTE	RT	RESOLUTION (%)
2-Fluorophenol (Surr)	5.74	100.0
Phenol-d5 (Surr)	6.51	100.0
Nitrobenzene-d5 (Surr)	7.30	100.0
Naphthalene	7,95	100.0
2-Fluorobiphenyl	8.81	100.0
Acenaphthylene	9.30	100.0
Acenaphthene	9,45	100.0
Fluorene	9,88	100.0
2,4,6-Tribromophenol (Surr)	10.09	100.0
Phenanthrene	10.71	100.0
Anthracene	10.75	100.0
Fluoranthene	11.81	100.0
Pyrene	12.07	100.0
p-Terphenyl-d14 (Surr)	12.16	100.0
Benzo[a]anthracene	13.59	100.0
Chrysene	13.64	100.0
Benzo[b]fluoranthene	15.31	19.50
Benzo[k]fluoranthene	15.35	100.0
Benzo[a]pyrene	15.87	100.0
Indeno[1,2,3-cd]pyrene	18.07	100.0
Dibenz(a,h)anthracene	18.08	100.0

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Lab Name: TestAmerica Buffalo

SDG No.:

Lab Sample ID (1): CCVIS 480-274392/3

GC Column (1): RXI-5Sil MS ID: 0.25(mm)

Date Analyzed (1): 11/11/2015 12:49

ANALYTE	RT	RESOLUTION (%)
2-Fluorophenol (Surr)	5.72	100.0
Phenol-d5 (Surr)	5.49	100.0
Nitrobenzene-d5 (Surr)	7.29	100.0
Naphthalene	7,94	100.0
2-Fluorobiphenyl	8.80	100.0
Acenaphthylene	9.29	100.0
Acenaphthene	9,44	100.0
Fluorene	9.88	100.0
2,4,6-Tribromophenol (Surr)	10.08	100.0
Phenanthrene	10,70	100.0
Anthracene	10.75	100.0
Fluoranthene	11.80	100.0
Pyrene	12.06	100.0
p-Terphenyl-d14 (Surr)	12.15	100.0
Benzo[a]anthracene	13.57	100.0
Chrysene	13,63	100.0
Benzo[b]fluoranthene	15.29	16,20
Benzo[k]fluoranthens	15.33	100.0
Benzo[a]pyrene	15.85	100.0
Indeno[1,2,3-cd]pyrene	18.03	100.0
Dibenz(a,h)anthracene	18.04	100.0

FORM VI 8270D

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FORM VII GC/MS SEMI VOA CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Buffalo Job No.: 480-89467-1

SDG No.:

Lab Sample ID: CCVIS 480-273910/3 Calibration Date: 11/09/2015 12:57

Instrument ID: HP5973V Calib Start Date: 10/26/2015 19:36

Lab File ID: V54272.D Conc. Units: ug/L

ANALYTE	CURVE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	&D	MAX %D
1,4-Dioxane	Linz		0.4301	0.0100	3670	4000	-8.4	50.0
N-Nitrosodimethylamine	Linl		0.9124	0.0100	4940	4000	23.5	25.0
Pyridine	Ave	1.384	1.393	0.0100	4030	4000	0.6	50.0
Benzaldehyde	Lini		0.3101	0.0100	1820	4000	-54.4*	40.0
PhenoL	Ave	1,482	1,309	0.8000	3530	4000	-11.7	20.0
Aniline	Ave	1,905	1.685	0.0100	3540	4000	-11.5	50.0
Bis(2-chloroethy1)ether	Ave	1.283	1.176	0.7000	3670	4000	-8.4	20.0
n Decane	Ave	1.986	1.864	0.0100	3760	4000	-6.1	40.0
2-Chlorophenol	Linl		1,260	0.8000	3850	4000	-3,8	20.0
1,3-Dichlorobenzene	Ave	1,454	1,460	0.0100	4020	4000	0.4	20.0
1,4-Dichlorobenzene	Ave	1.499	1.463	0.0100	3900	4000	-2.4	20.0
Benzyl alcohol	Ave	0.8436	0.6782	0.0100	3220	400.0	-19.6	50.0
1,2-Dichlorobenzene	Ave	1.407	1,378	0.0100	3920	4000	-2.0	20.0
2-Methylphenol	Ave	1.154	0.9801	0.7000	3400	4000	-15.1	20.0
bis (2-chloroisopropy1) ether	Ave	2,585	2.388	0.0100	3700	4000	-7.6	20.0
Indene	Ave	0.6110	0.6179		4040	4000	1.1	
4-Methylphenol	Ave	1.192	0.9481	0.6000	3180	4000	-20.4*	20.0
N-Nitrosodi-n-propylamine	Ave	0.8006	0.6586	0.5000	3290	4000	-17.7	20.0
Acetophenone	Ave	1.671	1,504	0.0100	3600	4000	-10.0	40.0
Hexachloroethane	Ave	0.5976	0.6397	0.3000	4280	4000	7.0	20.0
Nitrobenzene	Ave	0.3393	0.3478	0.2000	4100	4000	2.5	20.0
Isophorone	Ave	0.5778	0.5634	0.4000	3900	4000	-2.5	20.0
2,4-Dimethylphenol	Ave	0.3293	0.3306	0.2000	4020	4000	0.4	20.0
Z-Nitrophenel	Lini		0.1993	0.1000	4000	4000	-0.1	20.0
Benzoic acid	Linl		0.2333	0.0100	3750	4000	-6.3	25.0
Bis(2-chloroethoxy)methane	Ave	0.3772	0.3383	0.3000	3590	4000	-10.3	20.0
2,4-Dichlorophenol	Ave	0.2857	0.2779	0.2000	3890	4000	-2.7	20.0
1,2,4-Trichlosobenzene	Ave	0.3314	0.3515	0.0100	4240	4000	6.0	20.0
Naphthalene	Ave	1.021	0.9712	0.7000	3810	4000	-4.9	20.0
4-Chlocoaniline	Ave	0.5492	0.4227	0.0100	3080	4000	-23.0*	20.0
2,6-Dichlorophenol	Ave	0.2874	0.2783	0.0100	3870	4000	-3.2	50.0
Hexachlorobutadiene	Ave	0.1962	0.2330	0.0100	4750	4000	18.8	20.0
Caprolactam	Linl		0.1104	0.0100	3770	4000	-5.6	40.0
4-Chloro-3-merhylphenol	Ave	0.2785	0.3226	0.2000	4,630	4000	15.8	20.0
2-Methylnaphthalene	Ave	0.6860	0,6750	0.4000	3940	4000	-1.6	20.0
1-Methylnaphthalene	Ave	0.6344	0.6259	0.0100	3950	4000	-1.3	40.0
Hexachlorocyclopentadiene	Linl		0.3931	0.0500	3530	4000	-11.8	20.0
1,2,4,5 Tetrachlorobensene	Ave	0.5662	0.5704	0.0100	4030	4000	0.7	40.0
2,4,6-Trichlorophenol	Ave	0.3808	0.3988	0.2000	4190	4000	4.7	20.0
2,4,5-Trichlorophenol	Ave	0.4014	0.4271	0.2000	4260	4000	6.4	20.0

FORM VII 8270D

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FORM VII GC/MS SEMI VOA CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Buffalo Job No.: 480-89467-1

SDG No.:

Lab Sample ID: CCVIS 480-273910/3 Calibration Date: 11/09/2015 12:57

Lab File ID: V54272.D Conc. Units: ug/L

ANALYTE	CURVE	AVE RRE	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	& D	MAX %D
Siphenyl	Ave	1,513	1.520	0.0100	4020	4000	0.4	40.0
2-Chloronaphthalene	Ave	1,163	1.147	0.8000	3940	4000	-1.4	25.0
2-Nitroaniline	Lini		0.4076	0.0100	4370	4000	9.2	20.0
Dimethyl phthalate	Ave	1.303	1,425	0.0100	4380	4000	9.4	20.0
1,3-Dinittobenzene	Linz		0.1509	0.0100	4360	4000	9.0	50.0
2,6-Dinitrotoluene	Lini		0.3269	0.2000	4090	4000	2,2	20.0
Acenaphthylene	Ave	1.856	1,984	0.9000	4280	4000	6.9	20.0
3-Nitroaniline	Lini		0.3759	0.0100	4.050	4000	1.2	20.0
2,4-Dinitrophenol	Linl		0.1815	0.0100	6870	8000	-14.2	20.0
Acenaphthene	Ave	1.189	1,245	0.0100	4190	4000	4.7	20.0
4-Nitrophenol	Linl		0.2170	0.0100	9860	8000	23,2*	20.0
2,4-Dinitrotoluene	Linl		0.4642	0.0100	4390	400.0	9.7	20.0
Dibenzofuran	Ave	1.664	1,797	0.8000	4320	4000	8.0	20.0
2,3,4,6-Tetrachlorophenol	Linl		0.3311	0.0100	3820	4000	-4.5	40.0
Hexadecane	Ave	0.6634	0.6502	0.0100	3920	4000	-2.0	40.0
Diethyl phthalate	Linl		1,590	0.0100	3540	4000	-11.4	20.0
4-Chlorophenyl phenyl ether	Ave	0.6674	0.7282	0.4000	4360	4000	9.1	20.0
4-Nitroaniline	Linl		0.3642	0.0100	4030	4000	0.8	20.0
Fluorene	Ave	1.384	1,429	0.9000	4130	4000	3.3	20.0
4,6-Dinitro-2-methylphenol	Linl		0.1468	0.0100	7840	8000	-2.0	20.0
Diphenylemine	Ave	0.6569	0.6517	0.0100	67.90	6840	-0.8	50.0
N-Nitrosodiphenylamine	Ave	0.5617	0.5572	0.0100	7940	8000	-0.8	20.0
1,2-Diphenylhydrazine	Ave	0.7097	0.7188	0.0100	4050	4000	1.3	25.0
trans-Azobenzene	Ave	0.7097	0.7188	0.0100	4.050	4000	1.3	40.0
4-Bromophenyl phenyl ether	Ave	0.2476	0.2587	0.1,000	4180	4000	4.5	20.0
Atrazine	Linl		0.3950	0.0100	4270	4000	6.9	25.0
Hexachlorobenzene	Avé	0,2903	0.3254	0.1000	4480	4000	12.1	20.0
n-Octadecane	Ave	0.6565	0.6798	0.0100	4140	4000	3.5	40.0
Pentachlorophenol	Lini		0.1185	0.0500	5250	8000	-34-4*	20.0
Phenanthrene	Ave	1.090	1.098	0.7000	4.030	4000	0.7	20.0
Anthracene	Ave	1.080	1.089	0.7000	4030	4000	0.8	20.0
Carbazole	Ave	1,029	1.030	0.0100	4000	4000	0.0	20.0
Di-n-butyl phthalate	Linl		1,533	0.0100	4660	4000	16,5	20.0
Fluoranthene	Ave	1.199	1.270	0.6000	4230	4000	5.8	20.0
Benzidine	Linl		0.2963	0.0100	2110	400.0	-47.28	25.0
Pyrene	Ave	1.226	1.243	0.6000	4050	4000	1,3	20.0
Butyl benzyl phthalate	Lin1		0.6800	0.0100	4440	4000	11.0	20.0
Bis(2-ethylhexyl) phthalate	Linl		0.9786	0.0100	4520	4000	12.9	20.0
3,3'-Dichlorobenzidine	Linl		0.4449	0.0100	3950	4000	-1.2	20.0
Benzo[a]anthracene	Ave	1,123	1.148	0.8000	4090	4000	2.3	20.0
Chrysene	Ave	1.063	1.071	0.7000	4030	4000	0.8	20.0

FORM VII 8270D

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Lab Name: TestAmerica Buffalo

SDG No.:

Lab Sample ID: CCVIS 480-273910/3

Calibration Date: 11/09/2015 12:57

Instrument ID: HP5973V

Calib Start Date: 10/26/2015 19:36

GC Column: RXI-5Sil MS

ID: 0.25(mm)

Calib End Date: 10/26/2015 22:31

Lab File ID: V54272.D Conc. Units: ug/L

ANALYTE	CURVE	AVE RRF	RRF	MIN RRE	-CALC -AMOUNT	SPIKE AMOUNT	8D	MAX %D
Ui-n-octyl phthalate	Linz		1.681	0.0100	4620	4000	15.5	20.0
Benzo[b]fluoranthene	Linl		1,085	0.7000	3800	4000	-5.0	20.0
Benzo[k]fluoranthene	Lini		1.127	0.7000	3940	4000	-1.6	20.0
Benzo[a]pyrene	Lini		1.075	0.7000	3940	4000	-1.6	20.0
Indeno[1,2,3-cd]pyrene	Linz		1,317	0.5000	4180	4000	4.4	20.0
Dibenz(a, h) anthracene	Lini		1.099	0.4000	40.60	4000	1.5	20.0
Benzo[q,h,i]perylene	Ave	0,9852	1.070	0.5000	4350	4000	8.6	20.0
2 Fluorophenol (Surr)	Ave	1.168	1.109	0.0100	3800	4000	-5.0	25.0
PhenoI-dS (Surr)	Ave	1,436	1.273	0.0100	3550	4000	-11,3	25.0
Nitrobenzene-d5 (Surr)	Ave	0.3649	0.4003	0.0100	4390	4000	9.7	25.0
2-Fluorobiphenyl	Ave	1,359	1.394	0.0100	4100	4000	2,6	25.0
2,4,6-Tribromophenol (Surr)	Ave	0.1525	0.1762	0.0100	4620	4000	15.6	25.0
p-Terphenyl-d14 (Surr)	Ave	0.8914	0.9176	0.0100	4120	4000	2.9	25.0

FORM VII 8270D

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Lab Name: TestAmerica Buffalo Job No.: 480-89467-1

SDG No.:

Lab Sample ID: CCVIS 480-273999/3 Calibration Date: 11/10/2015 11:07

Instrument ID: HP5973V Calib Start Date: 10/26/2015 19:36

Lab File ID: V60002.D Conc. Units: ug/L

ANALYTE	CURVE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	& D	MAX %D
1,4-Dioxane	Linz		0.3817	0.0100	3260	4000	-18.5	50.0
N-Nitrosodimethylamine	Linl		0.8980	0.0100	4860	4000	21.6	25.0
Pyridine	Ave	1.384	1.299	0.0100	3760	4000	-6.1	50.0
Benzaldehyde	Lini		0.3338	0.0100	1950	4000	-51.3*	40.0
PhenoL	Ave	1,482	1,321	0.8000	3570	4000	-10.9	20.0
Aniline	Ave	1,905	1.662	0.0100	3490	4000	-12.8	50.0
Bis(2-chloroethy1)ether	Ave	1.283	1.173	0.7000	3660	4000	-8.6	20.0
n Decane	Ave	1.986	1.790	0.0100	3600	4000	-9.9	40.0
2-Chlorophenol	LinI		1.268	0.8000	3870	4000	-3,2	20.0
1,3-Dichlorobenzene	Ave	1,454	1,451	0.0100	3990	4000	-0.2	20.0
1,4-Dichlorobensene	Ave	1.499	1.537	0.0100	4100	4000	2,5	20.0
Benzyl alcohol	Ave	0.8436	0.7176	0.0100	3400	400.0	-14.9	50.0
1,2-Dichlorobenzene	Ave	1.407	1,384	0.0100	3930	4000	-1.6	20.0
2-Methylphenol	Ave	1.154	1.040	0.7000	3600	4000	-9.9	20.0
bis (2-chloroisopropy1) ether	Ave	2,585	2,297	0.0100	3560	4000	-11,1	20.0
Indene	Ave	0.6110	0.6027		3950	4000	-1.4	
4-Methylphenol	Ave	1,192	1.051	0.6000	3530	4000	-11.8	20.0
N-Nitrosodi-n-propylamine	Ave	0.8006	0.7659	0.5000	3830	4000	-4.3	20.0
Acetophenone	Ave	1.671	1.726	0.0100	4130	4000	3.3	40.0
Hexachloroethane	Ave	0.5976	0.6638	0.3000	4440	4000	11.1	20.0
Nitrobenzene	Ave	0.3393	0.3615	0.2000	4260	4000	6.5	20.0
Isophorone	Ave	0.5778	0.5490	0.4000	3800	4000	-5.0	20.0
2-Nitrophenol	Linl		0.1963	0.1000	3940	4000	-1.5	20.0
2,4-Dimethylphenol	Ave	0.3293	0.3467	0.2000	4210	4000	5,3	20.0
Benzoic acid	Linl		0.2287	0.0100	3680	4000	-7.9	25.0
Bis(2-chloroethoxy)methane	Ave	0.3772	0.3423	0.3000	3630	4000	-9.3	20.0
2,4-Dichlorophenol	Ave	0.2857	0.2977	0.2000	4170	4000	4.2	20.0
1,2,4-Trichlorobenzene	Ave	0.3314	0.3483	0.0100	4200	4000	5.1	20.0
Naphthalene	Ave	1.021	0.9940	0.7000	3890	4000	-2.6	20.0
4-Chloroaniline	Ave	0.5492	0.4189	0.0100	3050	4000	-23.7*	20.0
2,6-Dichlorophenol	Ave	0.2874	0.2927	0.0100	4070	4000	1.8	50.0
Hexachlorobutadiene	Ave	0.1962	0.2387	0.0100	4870	4000	21.7*	20.0
Caprolactam	Linl		0.1017	0.0100	3490	4000	-12.7	40.0
4-Chloro-3-merhylphenol	Ave	0.2785	0.3055	0.2000	4390	4000	9.7	20.0
2-Methylnaphthalene	Ave	0.6860	0,6913	0.4000	4030	400.0	0.8	20.0
1-Methylnaphthalene	Ave	0.6344	0.6333	0.0100	3990	4000	-0.2	40.0
Hexachlorocyclopentadiene	Linl		0.4483	0.0500	4020	4000	0.5	20.0
1,2,4,5 Tetrachlorobensene	Ave	0.5662	0.6285	0.0100	4440	4000	11.0	40.0
2,4,6-Trichlorophenol	Ave	0.3808	0.4193	0.2000	4400	4000	10.1	20.0
2,4,5-Trichlorophenol	Ave	0.4014	0.4134	0.2000	4120	4000	3.0	20.0

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Lab Name: TestAmerica Buffalo Job No.: 480-89467-1

SDG No.:

Lab Sample ID: CCVIS 480-273999/3 Calibration Date: 11/10/2015 11:07

Instrument ID: HP5973V Calib Start Date: 10/26/2015 19:36

Lab File ID: V60002.D Conc. Units: ug/L

ANALYTE	CURVE	AVE RRE	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	& D	MAX %D
Siphenyl	Ave	1,513	1.510	0.0100	3990	4000	-0.2	40.0
2-Chloronaphthalene	Ave	1,163	1,169	0.8000	4020	4000	0.5	25.0
2-Nitroaniline	Lini		0.3829	0.0100	4110	4000	2.7	20.0
Dimethyl phthalate	Ave	1.303	1.415	0.0100	4350	4000	8.6	20.0
1,3-Dinitrobenzene	Lini		0.1447	0.0100	4190	4000	4.6	50.0
2,6-Dinitrotoluene	Lin1		0.3364	0.2000	421,0	4000	5.2	20.0
Acenaphthylene	Ave	1.856	1,962	0.9000	4230	4000	5.7	20.0
3-Nitroaniline	Lini		0.3417	0.0100	3690	4000	-7.8	20.0
2,4-Dinitrophenol	Linl		0.1553	0.0100	5930	8000	-25,9*	20.0
Acenaphthene	Ave	1.189	1,233	0.0100	4150	4000	3.7	20.0
4-Nitrophenol	Linl		0.2206	0.0100	10000	8000	25.2*	20.0
2,4-Dinitrotoluene	Linl		0.4453	0.0100	4210	4000	5.4	20.0
Dibenzofuran	Ave	1.664	1.760	0.8000	4230	4000	5.8	20.0
2,3,4,6-Tetrachlorophenol	Linl		0.3415	0.0100	3940	4000	-1.6	40.0
Hexadecane	Ave	0.6634	0.6173	0.0100	3720	4000	-7.0	40.0
Diethyl phthalate	Linl		1.608	0.0100	3600	4000	-10.0	20.0
4-Chlorophenyl phenyl ether	Ave	0.6674	0.7207	0.4000	4320	4000	8.0	20.0
4-Nitroaniline	Linl		0.3529	0.0100	3910	4000	-2.2	20.0
Fluorene	Ave	1.384	1,416	0.9000	4090	4000	2.3	20.0
4,6-Dinitro-2-methylphenol	Linl		0.1394	0.0100	7470	8000	-6.7	20.0
Diphenylemine	Ave	0.6569	0.6506	0.0100	6770	6840	-1.0	50.0
N-Nitrosodiphenylamine	Ave	0.5617	0.5562	0.0100	7920	8000	-1.0	20.0
1,2-Diphenylhydrazine	Ave	0.7097	0.6934	0.0100	3910	4000	-2.3	25.0
tians-Asobensene	Ave	0.7097	0.6934	0.0100	3910	4000	-2.3	40.0
4-Bromophenyl phenyl ether	Ave	0.2476	0.2771	0.1,000	4480	4000	12.0	20.0
Atrazine	Linl		0.4241	0.0100	4590	4000	14.7	25.0
Hexachlorobenzene	Avé	0,2903	0.3535	0.1000	4870	4000	21.8*	20.0
n-Octadecane	Ave	0.6565	0.6300	0.0100	3840	4000	-4.0	40.0
Pentachlorophenol	Lini		0.1167	0.0500	5180	8000	-35,3*	20.0
Phenanthrene	Ave	1.090	1.104	0.7000	4050	400.0	1.3	20.0
Anthracene	Ave	1.080	1.104	0.7000	4090	4000	2.2	20.0
Carbazole	Ave	1,029	1.028	0.0100	4000	4000	-0.1	20.0
Di-n-butyl phthalate	Linl		1,528	0.0100	4640	4000	16.1	20.0
Fluoranthene	Ave	1.199	1,269	0.6000	4230	4000	5.8	20.0
Benzidine	Linl		0.2291	0.0100	1700	400.0	-57.6*	25.0
Pyrene	Ave	1.226	1.241	0.6000	4050	4000	1.2	20.0
Butyl benzyl phthalate	Lin1		0.6450	0.0100	4210	4000	5.3	20.0
Bis(2-ethylhexyl) phthalate	Linl		0.9407	0.0100	4340	4000	8.6	20.0
3,3'-Dichlorobenzidine	Linl		0.4451	0.0100	3950	4000	-1.2	20.0
Benzo[a]anthracene	Ave	1,123	1.124	0.8000	4000	4000	0.1	20.0
Chrysene	Ave	1.063	1.076	0.7000	4050	4000	1,3	20.0

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Lab Name: TestAmerica Buffalo

SDG No.:

Lab Sample ID: CCVIS 480-273999/3

Calibration Date: 11/10/2015 11:07

Instrument ID: HP5973V

Calib Start Date: 10/26/2015 19:36

GC Column: RXI-5sil MS

TD: 0.25(mm)

Calib End Date: 10/26/2015 22:31

Lab File ID: V60002.D

Conc. Units: ug/L

ANALYTE	CURVE	AVE BRE	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	8D	MAX %D
Di-n-octyl phthalate	Linl		1.571	0.0100	4320	4000	5.1	20.0
Benzo[b]fluoranthene	Linl		1,152	0.7000	4030	4000	0.8	20.0
Benzo[k]fluoranthene	Lini		1.144	0.7000	4000	4000	-0.0	20.0
Benzo[a]pyrene	Lini		1.100	0.7000	4030	4000	0.6	20.0
Indeno[1,2,3-cd]pyrene	Linz		1,394	0.5000	4420	4000	10.5	20.0
Dibens(a, h) anthracene	Linl		1.148	0.4000	4240	4000	6.0	20.0
Benzo[g,h,i]perylene	Ave	0,9852	1.136	0.5000	4610	4000	15.3	20.0
2-Fluorophenol (Surr)	Ave	1.168	1.107	0.0100	3790	4000	-5.2	25.0
PhenoI-d5 (Surr)	Ave	1,436	1.285	0.0100	3580	4000	-10.5	25.0
Nitrobenzene-d5 (Surr)	Ave	0.3649	0.4065	0.0100	4460	4000	11.4	25.0
2-Fluorobiphenyl	Ave	1,359	1.394	0.0100	4100	4000	2,6	25.0
2,4,6-Tribromophenol (Surr)	Ave	0.1525	0.1907	0.0100	5000	4000	25.0	25.0
p-Terphenyl-d14 (Surr)	Ave	0.8914	0.9110	0.0100	4090	4000	2.2	25.0

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Lab Name: TestAmerica Buffalo Job No.: 480-89467-1

SDG No.:

Lab Sample ID: CCVIS 480-274392/3 Calibration Date: 11/11/2015 12:49

Instrument ID: HP5973V Calib Start Date: 10/26/2015 19:36

Lab File ID: V60044.D Conc. Units: ug/L

ANALYTE	CURVE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
1,4-Dioxane	Linz		0.4255	0.0100	3630	4000	-9.3	50.0
N-Nitrosodimethylamine	Linl		D.9564	0.0100	5180	4000	29.5*	25.0
Pyridine	Ave	1.384	1,370	0.0100	3960	4000	-1.0	50.0
Benzaldehyde	Lini		0.3419	0.0100	1990	4000	-50.2*	40.0
PhenoL	Ave	1,482	1,356	0.8000	3660	4000	-8.5	20.0
Aniline	Ave	1,905	1.737	0.0100	3650	4000	-8.8	50.0
Bis(2-chloroethy1)ether	Ave	1.283	1.173	0.7000	3660	4000	-8.6	20.0
n Decane	Ave	1.986	1.865	0.0100	3760	4000	-6.1	40.0
2-Chlorophenol	LinI		1.279	0.8000	3910	4000	-2.3	20.0
1,3-Dichlorobenzene	Ave	1,454	1,480	0.0100	4070	4000	1.8	20.0
1,4-Dichlorobensene	Ave	1.499	1.530	0.0100	4080	4000	2.0	20.0
Benzyl alcohol	Ave	0.8436	0.6859	0.0100	3250	400.0	-18.7	50.0
1,2-Dichlorobenzene	Ave	1.407	1,374	0.0100	3910	4000	-2.4	20.0
2-Methylphenol	Ave	1.154	1.055	0.7000	3660	4000	-8.6	20.0
bis (2-chloroisopropy1) ether	Ave	2,585	2,363	0.0100	3660	4000	-8.6	20.0
Indene	Ave	0.6110	0.6182		4050	4000	1.2	
4-Methylphenol	Ave	1,192	1.075	0.6000	3610	4000	-9.8	20.0
N-Nitrosodi-n-propylamine	Ave	0.8006	0.7589	0.5000	3790	4000	-5.2	20.0
Acetophenone	Ave	1.671	1.675	0.0100	4010	4000	0.3	40.0
Hexachloroethane	Ave	0.5976	0.6568	0.3000	4400	4000	9.9	20.0
Nitrobenzene	Ave	0.3393	0.3666	0.2000	4,320	4000	8.0	20.0
Isophorone	Ave	0.5778	0.5904	0.4000	4090	4000	2.2	20.0
2,4-Dimethylphenol	Ave	0.3293	0.3632	0.2000	4410	4000	10.3	20.0
2-Nitrophenol	Lini		0.2034	0.1000	4080	4000	1.9	20.0
Benzoic acid	Linl		0.2064	0.0100	3370	4000	-15.7	25.0
Bis(2-chloroethoxy)methane	Ave	0.3772	0.3584	0.3000	3800	4000	-5.0	20.0
2,4-Dichlorophenol	Ave	0.2857	0.2993	0.2000	4190	4000	4.7	20.0
1,2,4-Trichlosobenzene	Ave	0.3314	0.3473	0.0100	4190	4000	4.8	20.0
Naphthalene	Ave	1.021	0.997	0.7000	3910	4000	-2,4	20.0
4-Chloroaniline	Ave	0.5492	0.4315	0.0100	3140	4000	-21.4*	20.0
2,6-Dichlorophenol	Ave	0.2874	0.3015	0.0100	4200	4000	4.9	50.0
Hexachlorobutadiene	Ave	0.1962	0.2366	0.0100	4820	4000	20.6*	20.0
Caprolactam	Linl		0.0987	0.0100	3390	4000	-15.2	40.0
4-Chloro-3-methylphenol	Ave	0.2785	0.3163	0.2000	4540	4000	13.6	20.0
2-Methylnaphthalene	Ave	0.6860	0,6907	0.4000	4030	400.0	0.7	20.0
1-Methylnaphthalene	Ave	0.6344	0.6403	0.0100	4040	4000	0.9	40.0
Hexachlorocyclopentadiene	Linl		0.4520	0.0500	4050	4000	1.3	20.0
1,2,4,5 Tetrachlorobensene	Ave	0.5662	0.6340	0.0100	4480	4000	12.0	40.0
2,4,6-Trichlorophenol	Ave	0.3808	0.4027	0.2000	4230	4000	5.7	20.0
2,4,5-Trichlorophenol	Ave	0.4014	0.4294	0.2000	4280	4000	7.0	20.0

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Lab Name: TestAmerica Buffalo Job No.: 480-89467-1

SDG No.:

Lab Sample ID: CCVIS 480-274392/3 Calibration Date: 11/11/2015 12:49

Instrument ID: HP5973V Calib Start Date: 10/26/2015 19:36

Lab File ID: V60044.D Conc. Units: ug/L

ANALYTE	CURVE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	&D	MAX %D
Biphenyl	Ave	1,513	1.534	0.0100	4050	4000	1.4	40.0
2-Chloronaphthalene	Ave	1,163	1,193	0.8000	4100	4000	2.6	25.0
2-Nitroaniline	Lini		0.4119	0.0100	4410	4000	10.3	20.0
Dimethyl phthalate	Ave	1.303	1.420	0.0100	4360	4000	9.0	20.0
1,3-Dinitrobenzene	Linz		0.1475	0.0100	4270	4000	6.6	50.0
2,6-Dinitrotoluene	Lini		0.3458	0.2000	4320	4000	8.1	20.0
Acenaphthylene	Ave	1.856	1.984	0.9000	4280	4000	6.9	20.0
3-Nitroaniline	Lini		0,3589	0.0100	3870	4000	-3,3	20.0
2,4-Dinitrophenol	Linl		0.1792	0.0100	6780	8000	-15.2	20.0
Acenaphthene	Ave	1.189	1,255	0.0100	4220	4000	5.5	20.0
4-Nitrophenol	Linl		0.2491	0.0100	11300	8000	41,24	20.0
2,4-Dinitrotoluene	Linl		0.4615	0.0100	4.370	400.0	9.1	20.0
Dibenzofuran	Ave	1.664	1,766	0.8000	4250	4000	6.1	20.0
2,3,4,6-Tetrachlorophenol	Linl		0.3289	0.0100	3800	4000	-5.1	40.0
Hexadecane	Ave	0,6634	0.6606	0.0100	3980	4000	-0.4	40.0
Diethyl phthalate	Linl		1,607	0.0100	3590	4000	-10.1	20.0
4-Chlorophenyl phenyl ether	Ave	0.6674	0.6975	0.4000	4180	4000	4.5	20.0
4-Nitroaniline	Linl		0.3614	0.0100	4000	4000	0.0	20.0
Fluorene	Ave	1.384	1,410	0.9000	4070	4000	1.9	20.0
4,6-Dinitro-2-methylphenol	Linl		0.1438	0.0100	7690	8000	-3.9	20.0
Diphenylemine	Ave	0.6569	0.6757	0.0100	7040	6840	2.9	50.0
N-Nitrosodiphenylamine	Ave	0.5617	0.5777	0.0100	8230	8000	2.9	20.0
1,2-Diphenylhydrazine	Ave	0.7097	0.7425	0.0100	4190	4000	4.6	25.0
trans-Azobenzene	Ave	0.7097	0.7425	0.0100	4190	4000	4.6	40.0
4-Bromophenyl phenyl ether	Ave	0.2476	0.2654	0.1,000	4290	4000	7.2	20.0
Atrazine	Lini		0.3986	0.0100	4310	4000	7.8	25.0
Hexachlorobenzene	Ave	0,2903	0.3398	0.1000	4680	4000	17.1	20.0
n-Octadecane	Ave	0.6565	0.6560	0.0100	4000	4000	-0.0	40.0
Pentachlorophenol	Lini		0.1464	0.0500	6430	8000	-19.6	20.0
Phenanthrene	Ave	1.090	1.093	0.7000	4010	4000	0.3	20.0
Anthracene	Ave	1.080	1.099	0.7000	4070	4000	1.8	20.0
Carbazole	Ave	1,029	0.9916	0.0100	3860	4000	-3.6	20.0
Di-n-butyl phthalate	Linl		1,548	0.0100	4710	4000	17.7	20.0
Fluoranthene	Ave	1.199	1,229	0.6000	4100	4000	2.5	20.0
Benzidine	Linl		0.3088	0.0100	2190	400.0	-45.2*	25.0
Pyrene	Ave	1,226	1.257	0.6000	4100	4000	2.5	20.0
Butyl benzyl phthalate	Lin1		0.6897	0.0100	4500	4000	12.5	20.0
Bis(2-ethylhexyl) phthalate	Linl		0.9843	0.0100	4540	4000	13.5	20.0
3,3'-Dichlorobenzidine	Linl		0.4607	0.0100	4090	4000	2.2	20.0
Benzo[a]anthracene	Ave	1,123	1.126	0.8000	4010	4000	0.3	20.0
Chrysene	Ave	1.063	1.031	0.7000	3880	4000	-3.0	20.0

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Lab Name: TestAmerica Buffalo Job No.: 480-89467-1

SDG No.:

Lab Sample ID: CCVIS 480-274392/3 Calibration Date: 11/11/2015 12:49

Instrument ID: HP5973V Calib Start Date: 10/26/2015 19:36

GC Column: RXI-5Sil MS TD: 0.25 (mm) Calib End Date: 10/26/2015 22:31

Lab File ID: V60044.D Conc. Units; ug/L

ANALYTE	CURVE	AVE BRE	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	€D.	MAX %D
Di-n-octyl phthalate	Linl		1.675	0.0100	4610	4000	15.1	20.0
Benzo[b]fluoranthene	Linl		1,152	0.7000	4030	4000	0.8	20.0
Benzo[k]fluorantheme	Lini		1.145	0.7000	4000	4000	0.0	20.0
Benzo[a]pyrene	Lini		1.111	0.7000	4060	4000	1,6	20.0
Indeno[1,2,3-cd]pyrene	Linz		1,388	0.5000	4400	4000	10.0	20.0
Dibens(a, h) anthracene	Linl		1.176	0.4000	4340	4000	8.5	20.0
Benzo[g,h,i]perylene	Ave	0,9852	1.147	0.5000	4660	4000	16,4	20.0
2-Fluorophenol (Surr)	Ave	1.168	1.134	0.0100	3880	4000	-2.9	25.0
PhenoI-d5 (Surr)	Ave	1,436	1.321	0.0100	3680	4000	-8.0	25.0
Nitrobenzene-d5 (Surr)	Ave	0.3649	0.4256	0.0100	4660	4000	16.6	25.0
2-Fluorobiphenyl	Ave	1,359	1.431	0.0100	4210	4000	5.3	25.0
2,4,6-Tribromophenol (Surr)	Ave	0.1525	0.1842	0.0100	4830	400.0	20.8	25.0
p-Terphenyl-d14 (Surr)	Ave	0.8914	0,9139	0.0100	4100	4000	2.5	25.0

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Lab Name: TestAmerica Buffalo Job No.: 480-89467-1

SDG No.:

Lab Sample ID: CCVIS 480-273506/3 Calibration Date: 11/05/2015 10:42

Instrument ID: HP5973X Calib Start Date: 10/23/2015 08:33

Lab File ID: X009014095.D Conc. Units: ug/L

ANALYTE	CURVE	AVE RRF	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	&D	MAX %D
1,4-Dioxane	Ave	0.6195	0.6388	0.0100	51600	50000	3.1	50.0
N-Nitrosodimethylamine	Ave	0.7217	0.6399	0.0100	44300	50000	-11.3	25.0
Pyridine	Ave	1.298	1.164	0.0100	44800	50000	-10.4	50.0
Benzaldehyde	Lini		0.4299	0.0100	40800	50000	-18.4	40.0
Phenol	Ave	1,767	1,692	0.8000	47900	50000	-4.3	20.0
Aniline	Ave	2,123	2.086	0.0100	49100	50000	-1.8	50.0
Bis(2-chloroethy1)ether	Ave	1.423	1.388	0.7000	48800	50000	-2.4	20.0
2-Chlorophenol	Ave	1.452	1.418	0.8000	48800	50000	-2.4	20.0
n-Decane	Ave	1,787	1,604	0.0100	44900	50000	-10.2	40.0
1,3-Dichlorobenzene	Ave	1.558	1,570	0.0100	50400	50000	0.8	20.0
1,4-Dichlorobenzene	Ave	1.593	1.595	0.0100	50100	50000	0.1	20.0
Benzyl alcohol	Ave	0.9222	0.9150	0.0100	49600	50000	-0.8	50.0
1,2-Dichlorobenzene	Ave	1.489	1.477	0.0100	49600	50000	-0.8	20.0
2-Methylphenol	Ave	1.271	1.242	0.7000	48800	50000	-2.3	20.0
bis (2-chloroisopropyl) ether	Ave	1.866	1,584	0.0100	42400	50000	-15,1	20.0
Indene	Ave	0.7740	0.8537		55200	50000	10,3	
4-Methylphenol	Ave	1.315	1.266	0.6000	48200	50000	-3.7	20.0
N-Nitrosodi-n-propylamine	Ave	0.9726	0.9126	0.5000	46900	50000	-6.2	20.0
Acetophenone	Ave	1.858	1,811	0.0100	48700	50000	-2.5	40.0
Hexachloroethane	Ave	0.6118	0.6065	0.3000	49600	50000	-0.9	20.0
Nitrobenzene	Ave	0.3772	0.3526	0.2000	46700	5,0000	-6.5	20.0
Isophorone	Ave	0.6697	0.6557	0.4000	49000	50000	-2.1	20.0
2-Nitrophenol	Linl		0.1794	0.1000	44700	50000	-10.6	20.0
2,4-Dimethylphenol	Ave	0.3637	0.3607	0.2000	49600	50000	-0.8	20.0
Benzoic acid	Linl		0.1991	0.0100	37600	50000	-24.8	25.0
Bis(2-chloroethoxy)methane	Ave	0.4257	0.4147	0.3000	48700	5,0000	-2.6	20.0
2,4-Dichlorophenol	Ave	0.3032	0.3081	0.2000	50800	50000	1.6	20.0
1,2,4-Trichlosobenzene	Ave	0.3317	0.3428	0.0100	51700	50000	3.4	20.0
Naphthalene	Ave	0,998	1,026	0.7000	51400	50000	2,9	20.0
4-Chloroaniline	Ave	0.4395	0.4512	0.0100	51300	50000	2.7	20.0
2,6-Dichlorophenol	Ave	0.2992	0.3052	0.0100	51000	50000	2.0	50.0
Hexachlorobutadiene	Ave	0.1875	0.2004	0.0100	53400	50000	6.9	20.0
Caprolactam	Linl		0,1001	0.0100	43500	50000	-13,1	40.0
4-Chloro-3-methylphenol	Ave	0.3038	0.2996	0.2000	49300	50000	-1.4	20.0
2-Methylnaphthalene	Ave	0.6663	0.6719	0.4000	50400	5,000.0	0.8	20.0
1-Methylnaphthalene	Ave	0.6059	0.6212	0.0100	51300	50000	2.5	40.0
Hexachlorocyclopentadiene	Lini		0.4386	0.0500	50700	50000	1.4	20.0
1,2,4,5 Tetrachlorobensene	Ave	0.5602	0.5874	0.0100	52400	50000	4.8	40.0
2,4,6-Trichlorophenol	Linl		0.3941	0.2000	49500	50000	-1.1	20.0
2,4,5-Trichlorophenol	Lini		0.4011	0.2000	48000	50000	-4.1	20.0

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Lab Name: TestAmerica Buffalo Job No.: 480-89467-1

SDG No.:

Lab Sample ID: CCVIS 480-273506/3 Calibration Date: 11/05/2015 10:42

Instrument ID: HP5973X Calib Start Date: 10/23/2015 08:33

Lab File ID: X009014095.D Conc. Units: ug/L

ANALYTE	CURVE	AVE RRE	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	&D	MAX %D
Siphenyl	Ave	1.389	1,436	0.0100	51700	50000	3.4	40.0
2-Chloronaphthalene	Ave	1,151	1,192	0.8000	51800	50000	3.6	25.0
2-Nitroaniline	Lini		0.3079	0.0133	43700	50000	-12.7	20.0
Dimethyl phthalate	Ave	1.278	1.276	0.0100	49900	50000	-0.2	20.0
1,3-Dinittobenzene	Linz		0.1022	0.0100	41600	50000	-16.9	50.0
2,6-Dinitrotoluene	Lini		0.2785	0.2000	44000	50000	-12-1	20.0
Acenaphthylene	Ave	1,712	1,750	0.9000	51100	50000	2.2	20.0
3-Nitroaniline	Lini		0.3120	0.0100	44500	50000	-10.9	20.0
2,4-Dinitrophenol	Linl		0.1617	0.0100	86700	100000	-13,3	20.0
Acenaphthene	Ave	1,076	1,088	0.0100	50500	50000	1.1	20.0
4-Nitrophenol	Linl		0.1593	0.0100	89700	1/00000	-10,3	20.0
2,4-Dinitrotoluene	Linl		0.3620	0.0100	43100	50000	-13.8	20.0
Dibenzofuran	Ave	1.583	1.605	0.8000	50700	50000	1,3	20.0
2,3,4,6-Tetrachlorophenol	Linl		0.3072	0.0100	48200	50000	-3.6	40.0
Diethyl phthalate	Ave	1.219	1.196	0.0100	49100	50000	-1.9	20.0
Remadecane	Linl		0.8266	0.0100	48000	50000	-3.9	40,0
4-Chlorophenyl phenyl ether	Ave	0.6446	0.6530	0.4000	50600	5,0000	1.3	20.0
4-Nitroaniline	Linl		0.3196	0.0100	45000	50000	-9.9	20.0
Fluorene	Ave	1.265	1,286	0.9000	50800	50000	1.6	20.0
4,6-Dinitro-2-methylphenol	Linl		0.1427	0.0100	89100	100000	-10,9	20.0
Diphenylemine	Ave	0.6469	0.6769	0.0100	89500	85500	4.6	50.0
N-Nitrosodiphenylamine	Ave	0.5531	0.5788	0.0100	105000	100000	4.6	20.0
1,2-Diphenylhydrazine	Ave	1,235	1.189	0.0100	46100	50000	-3.7	25.0
trans-Asobensene	Ave	0.7660	0.7725	0.0100	50400	50000	0.8	40.0
4-Bromophenyl phenyl ether	Ave	0,2333	0.2525	0.1000	54100	50000	8.2	20.0
Hexachlorobenzene	Ave	0.2443	0.2639	0.1000	54000	50000	8.0	20.0
Atrazine	Lini		0.3434	0.0100	47000	50000	-5.9	25,0
Pentachlocophenol	Lini		0.1493	0.0500	108000	100000	7.7	20.0
n-Octadecane	Ave	0.5630	0.5156	0.0100	45800	50000	-8.4	40.0
Phenanthrene	Linl		1.127	0.7000	53900	50000	7.7	20.0
Anthracene	Linl		1.132	0.7000	53700	50000	7.5	20.0
Carbazole	Ave	1,047	1.041	0.0100	49700	50000	-0,6	20.0
Di-n-butyl phthalate	Ave	1,196	1,200	0.0100	50200	50000	0.3	20.0
Fluoranthene	Ave	1.171	1,206	0.6000	51500	50000	3.0	20.0
Benzidine	Linl		0.3350	0.0100	39700	50000	-20.6	25.0
Pyrene	Ave	1.150	1.172	0.6000	51000	5,0000	1.9	20.0
Butyl benzyl phthalate	Lini		0.5391	0.0100	48100	50000	~3.9	20.0
Bis(2-ethylhexyl) phthalate	Linl		0.7597	0.0100	48500	50000	-3.1	20.0
3,3'-Dichlorobenzidine	Linl		0.4446	0.0100	51000	50000	2.0	20.0
Benzo[a]anthracene	Ave	1.131	1,143	0.8000	50500	50000	1.0	20.0
Chrysene	Ave	1.074	1.090	0.7000	50700	50000	1,5	20.0

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Lab Name: TestAmerica Buffalo Job No.: 480-89467-1

SDG No.:

Lab Sample ID: CCVIS 480-273506/3 Calibration Date: 11/05/2015 10:42

Instrument ID: HP5973X Calib Start Date: 10/23/2015 08:33

GC Column: RXI-5Sil MS ID: 0.25 (mm) Calib End Date: 10/23/2015 10:48

Lab File ID: X009014095.D Conc. Units: ug/L

ANALYTE	CURVE	AVE BRE	RRF	MIN RRF	CALC AMOUNT	SPIKE AMOUNT	8 D	MAX %D
Di-n-octyl phthalate	Linz		1,312	0.0100	50500	50000	1.0	20.0
Benzo[b]fluoranthene	Linl		1.279	0.7000	54400	50000	8.9	20.0
Benzo[k]fluorantheme	Ave	1.215	1.183	0.7000	48700	50000	-2.6	20.0
Benzo[a]pyrene	Ave	1.122	1.151	0.7000	51300	50000	2.5	20.0
Dibenz(a, h) anthracene	Ave	1,082	1,135	0.4000	52500	50000	5.0	20.0
Indeno[1,2,3-cd]pytene	Ave	1,269	1.337	0.5000	52700	50000	5.3	20.0
Benzo[g,h,i]perylene	Ave	1.054	1.126	0.5000	53400	50000	6,8	20.0
2-Fluorophenol (Surr)	Ave	1.450	1.430	0.0100	49300	50000	-1.4	25.0
Phenol-d5 (Surr)	Ave	1,696	1.654	0.0100	49100	50000	-1.9	25.0
Nitrobenzene-d5 (Surr)	Ave	0.3798	0.3391	0.0100	44600	50000	-10.7	25.0
2-Fluorobiphenyl	Ave	1,321	1.383	0.0100	52300	50000	4.6	25.0
2,4,6-Tribromophenol (Surr)	Linl		0.1224	0.0100	50700	5,0000	1.4	25.0
p-Terphenyl-d14 (Surr)	Ave	0.8371	0.8520	0.0100	50900	50000	1.8	25.0

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Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1
SDG No.:	
Client Sample ID:	Lab Sample ID: MB 480-273073/1-A
Matrix: Waste	Lab File ID: X009014105.D
Analysis Method: 8270D	Date Collected:
Extract, Method: 3560A	Date Extracted: 11/04/2015 13:45
Sample wt/vol: 0.10(g)	Date Analyzed: 11/05/2015 15:13
Con. Extract Vol.: 1(mL)	Dilution Factor: 1
Injection Volume: 1(uL)	Level: (low/med) Low
% Moisture:	GPC Cleanup; (Y/N) N
Analysis Batch No.: 273506	Units: ug/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
83-32-9	Acenaphthene	ND		3400	40
208-96-8	Acenaphthylene	ND		3400	28
120-12-7	Anthracene	ND		3400	86
56-55-3	Benzo[a]anthracene	ND		3400	5.8
50-32-8	Benzo[a]pyrene	ND		3400	82
205-99-2	Benzo[b] fluoranthene	ND		3400	-66
191-24-2	Benzolg,h,ilperylene	ND		3400	4.0
207-08-9	Benzo[k]fluoranthene	ND		3400	38
218-01-9	Chrysene	ND		3400	34
53-70-3	Dibenz(a,h)anthracene	ND		3400	40
206-44-0	Fluoranthene	ND		3400	48
86-73-7	Fluorene	ND		3400	78
193-39-5	Indeno[1,2,3-cd]pyrene	ND.		3400	94
91-20-3	Naphthalene	ND		3400	56
85-01-8	Phenanthrene	ND		3400	70
129-00-0	Pyrene	ND		3400	22

CAS NO.	SURROGATE	%REC	Q	LIMITS
321-60-8	2-Fluorobiphenyl	98		37-120
4165-60-0	Nitrobenzene-d5 (Surr)	86		34-132
1718-51-0	p-Terphenyl d14 (Surr)	99		65-153

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Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1
SDG No.:	
Client Sample ID:	Lab Sample ID: MB 480-273586/1-A
Matrix; Water	Lab File ID: V54275.D
Analysis Method: 8270D	Date Collected:
Extract, Method: 3510C	Date Extracted: 11/06/2015 12:33
Sample wt/vol: 250(mL)	Date Analyzed: 11/09/2015 14:26
Con. Extract Vol.: 1(mL)	Dilution Factor: 1
Injection Volume: 2(uL)	Level: (low/med) Low
% Moisture:	GPC Cleanup: (Y/N) N
Analysis Batch No.: 273910	Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
83-32-9	Acenaphthene	ND		5.0	0.41
208-96-8	Acenaphthylene	ND		5.0	0.38
120-12-7	Anthracene	ND		5.0	0.28
56-55-3	Benzo[a]anthracene	ND		5.0	0.36
50-32-8	Benzo[a]pyrene	ND		5.0	0.47
205-99-2	Benzo[b] fluoranthene	ND		5.0	0.34
191-24-2	Benzo[g,h,i]perylene	ND		5.0	0.35
207-08-9	Benzo[k]fluoranthene	ND		5.0	0.73
218-01-9	Chrysene	ND		5.0	0.33
53-70-3	Dibenz (a, h) anthracene	ND		5.0	0.42
206-44-0	Fluoranthene	ND		5.0	0.40
86-73-7	Fluorene	ND		5.0	0.36
193-39-5	Indeno[1,2,3-cd]pyrene	ND.		5.0	0.47
91-20-3	Naphthalene	NI		5.0	0.76
85-01-8	Phenanthrene	ND		5.0	0.44
129-00-0	Pyrene	ND		5.0	0.34

CAS NO.	SURROGATE	%REC	Q	LIMITS
321-60-8	2-Fluorobiphenyl	86		48-120
4165-60-0	Nitrobenzene-d5 (Surr)	82		46-120
1718-51-0	p-Terphenyl d14 (Surr)	99		67-150

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Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1
SDG No.:	
Client Sample ID:	Lab Sample ID: LCS 480-273073/2-A
Matrix; Waste	Lab File ID: X009014106.D
Analysis Method: 8270D	Date Collected:
Extract, Method: 3580A	Date Extracted: 11/04/2015 13:45
Sample wt/vol: 0.10(g)	Date Analyzed: 11/05/2015 15:40
Con. Extract Vol.: 1(mL)	Dilution Factor: 1
Injection Volume: 1(uL)	Level: (low/med) Low
% Moisture:	GPC Cleanup; (Y/N) N
Analysis Batch No.: 273506	Units: ug/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
83-32-9	Acenaphthene	460000		3400	40
208-96-8	Acenaphthylene	453000		3400	28
120-12-7	Anthracene	517000		3400	86
56-55-3	Benzo[a]anthracene	502000		3400	5.8
50-32-8	Benzo[a]pyrene	497000		3400	82
205-99-2	Benzo[b] fluoranthene	488000		3400	-66
191-24-2	Benzo[g,h,i]perylene	508000		3400	40
207-08-9	Benzo[k]fluoranthene	514000		3400	38
218-01-9	Chrysene	492000		3400	34
53-70-3	Dibenz (a, h) anthracene	506000		3400	40
206-44-0	Fluoranthene	503000		3400	48
86-73-7	Fluorene	483000		3400	78
193-39-5	Indeno[1,2,3-cd]pyrene	505000		3400	94
91-20-3	Naphthalene	438000		3400	56
85-01-8	Phenanthrene	518000		3400	70
129-00-0	Pyrene	516000		3400	22

CAS NO.	SURROGATE	%REC	Q	LIMITS
321-60-8	2-Fluorobiphenyl	93		37-120
4165-60-0	Nitrobenzene-d5 (Surr)	79		34-132
1718-51-0	p-Terphenyl-d14 (Surr)	102		65-153

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Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1
SDG No.:	
Client Sample ID:	Lab Sample ID: LCS 480-273586/2-A
Matrix: Water	Lab File ID: V54276.D
Analysis Method: 8270D	Date Collected:
Extract, Method: 3510C	Date Extracted: 11/06/2015 12:33
Sample wt/vol: 250(mL)	Date Analyzed: 11/09/2015 14:56
Con. Extract Vol.: 1(mL)	Dilution Factor: 1
Injection Volume: 2(uL)	Level: (low/med) Low
% Moisture:	GPC Cleanup; (Y/N) N
Analysis Batch No.: 273910	Units: ug/L

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
83-32-9	Acenaphthene	14.5		5.0	0.41
208-96-8	Acenaphthylene	14.7		5.0	0.38
120-12-7	Anthracene	14.8		5.0	0.28
56-55-3	Benzo[a]anthracene	15.0		5.0	0.36
50-32-8	Benzo[a]pyrene	14.5		5.0	0.47
205-99-2	Benzo[b] fluoranthene	14.5		5.0	0.34
191-24-2	Benzolg,h,ilperylene	17.1		5.0	0.35
207-08-9	Benzo[k]fluoranthene	14.4		5.0	0.73
218-01-9	Chrysene	15.0		5.0	0.33
53-70-3	Dibenz(a,h)anthracene	15.9		5.0	0.42
206-44-0	Fluoranthene	15.4		5.0	0.40
86-73-7	Fluorene	15.0		5.0	0.36
193-39-5	Indeno[1,2,3-cd]pyrene	15.8		5.0	0.47
91-20-3	Naphthalene	12.8		5.0	0.76
85-01-8	Phenanthrene	14.9		5.0	0.44
129-00-0	Pyrene	15.5		5.0	0.34

CAS NO.	SURROGATE	%REC	Q	LIMITS
321-60-8	2-Fluorobiphenyl	83		48-120
4165-60-0	Nitrobenzene-d5 (Surr)	83		46-120
1718-51-0	p-Terphenyl-d14 (Surr)	98		67-150

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Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1
SDG No.:	
Client Sample ID:	Lab Sample ID: LCSD 480-273073/3-A
Matrix: Waste	Lab File ID; X009014107.D
Analysis Method: 8270D	Date Collected:
Extract, Method: 3560A	Date Extracted: 11/04/2015 13:45
Sample wt/vol: 0.10(g)	Date Analyzed: 11/05/2015 16:07
Con. Extract Vol.: 1(mL)	Dilution Factor: 1
Injection Volume: 1(uL)	Level: (low/med) Low
% Moisture:	GPC Cleanup; (Y/N) N
Analysis Batch No.: 273506	Units: ug/Kg

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
83-32-9	Acenaphthene	455000		3400	40
208-96-8	Acenaphthylene	452000		3400	28
120-12-7	Anthracene	492000		3400	86
56-55-3	Benzo[a]anthracene	469000		3400	5.8
50-32-8	Benzo[a]pyrene	471000		3400	82
205-99-2	Benzo[b]fluoranthene	466000		3400	-66
191-24-2	Benzo[g,h,i]perylene	482000		3400	40
207-08-9	Benzo[k]fluoranthene	491000		3400	38
218-01-9	Chrysene	467000		3400	34
53-70-3	Dibenz (a, h) anthracene	481000		3400	40
206-44-0	Fluoranthene	486000		3400	48
86-73-7	Fluorene	469000		3400	78
193-39-5	Indeno[1,2,3-cd]pyrene	474000		3400	94
91-20-3	Naphthalene	428000		3400	56
85-01-8	Phenanthrene	495000		3400	70
129-00-0	Pyrene	478000		3400	22

CAS NO.	SURROGATE	%REC	Q	LIMITS
321-60-8	2-Fluorobiphenyl	93		37-120
4165-60-0	Nitrobenzene-d5 (Surr)	82		34-132
1718-51-0	p-Terphenyl d14 (Surr)	96		65-153

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Lab Name: TestAmerica Buffalo Job No.: 480-89467-1

SDG No.:

Instrument TD: HP5973V Start Date: 10/26/2015 19:07

Analysis Batch Number: 271208 End Date: 10/27/2015 06:08

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
DFTPP 480-271208/2		10/26/2015 19:07	1	V53779.D	RXI-5Sil MS 0.25(mm)
IC 480-271208/3		10/26/2015 19:36	1	V53780.D	RXI-5Sil MS 0.25(mm)
IC 480-271208/4		10/26/2015 20:05	1	V53781.D	RXI-5S11 MS 0.25(mm)
TC 480-271208/5		10/26/2015 20:35	1	V53782.D	RXI-5Sil MS 0,25(mm)
1CIS 480-271208/6		10/26/2015 21:04	1	V53783.D	RXI-5Sil MS 0.25(mm)
IC 480-271208/7		10/26/2015 21:33	1	V53784.D	RXI-5Sil MS 0.25(mm)
IC 480-271208/8		10/26/2015 22:02	1	V53785.D	RXI-5Sil MS 0.25(mm)
IC 480-271208/9		10/26/2015 22:31	1	V53786.D	RXI-5Sil MS 0.25(mm)
TCV 480-271208/10		10/26/2015 23:00	1		R301-5Sil MS 0.25(mm)
IC 480-271208/11		10/26/2015 23:29	1		RXI-5S11 MS 0.25(mm)
IC 480-271208/12		10/26/2015 23:57	1		RMI-5Sil MS 0.25(mm)
IC 480-271208/13		10/27/2015 00:26	1		RXI-5Sil MS 0,25(mm)
IC 480-271208/14		10/27/2015 00:55	1		RXI-5S11 MS 0.25(mm)
1C 480-27120B/15		10/27/2015 01:23	1		RXI-5811 MS 0.25(mm)
IC 480-271208/16		10/27/2015 01:52	1		RXI-5Sil MS 0,25(mm)
IC 480-271208/17		10/27/2015 02:20	1		RMI-5Sil MS 0.25(mm)
ICV 480-271208/18		10/27/2015 02:49	1		RXI-5S11 MS 0.25(mm)
IC 480-271203/19		10/27/2015 03:17	1		RXI-5Sil MS 0.25(mm)
IC 480-271208/20		10/27/2015 03:45	1		RXI-5Sil MS 0.25(mm)
IC 480-271208/21		10/27/2015 04:14	1		RXI-5811 MS 0.25(mm)
IC 480-271208/22		10/27/2015 04:42	1		RXI-5Sil MS 0.25(mm)
TC 480-271208/23		10/27/2015 05:11	1		RXI-5Sil MS 0.25(mm)
IC 480-27120B/24		10/27/2015 05:39	1		RXI-5Sil MS 0.25(mm)
IC 480-271208/25		10/27/2015 06:08	1		RXI-5Sil MS 0,25(mm)

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Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1
SDG No.:	
Instrument ID: HP5973V	Start Date: 11/09/2015 12:27
Analysis Batch Number: 273910	End Date: 11/09/2015 23:22

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
DETER 480-273910/2		11/09/2015 12:27	1	V54271.D	RXI-5511 MS 0.25(mm)
CCVIS 480-273910/3		11/09/2015 12:57	1	V54272.D	RXI-5511 MS 0.25(mm)
RL 480-273910/4		11/09/2015 13:26	1		RXI-5S11 MS 0.25(mm)
CCV 480-273910/5		11/09/2015 13:56	1		RXI-5S11 MS 0,25(mm)
MB 480-273586/1-A		11/09/2015 14:26	1	V54275.D	RXI-5Sil MS 0.25(mm)
LCS 480-273586/2-A		11/09/2015 14:56	1	V54276.D	RXI-5Sil MS 0.25(mm)
ZZZZZ		11/09/2015 15:25	1		RXI-5Sil MS 0.25(mm)
ZZZZZ		11/09/2015 15:55	1.		RXI-5511 MS 0.25 (mm)
22222		11/09/2015 20:53	5		RXI-5Sil MS 0.25(mm)
22222		11/09/2015 21:23	1		RXI-5S11 MS 0,25(mm)
ZZZZZ		11/09/2015 21:53	1		RXI-5Sil MS 0.25(mm)
22222		11/09/2015 22:23	10		RXI-5Sil MS 0.25(mm)
ZZZZZ		11/09/2015 22:52	5		RXI-5Sil MS 0.25(mm)
23222		11/09/2015 23:22	1		RMI-5Sil MS 0.25(mm)

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Lab Name: TestAmerica Buffalo Job No.: 480-89467-1

SDG No.:

Instrument ID: HP5973V Start Date: 11/10/2015 10:38

Analysis Batch Number: 273999 End Date: 11/10/2015 21:15

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
DETER 480-273999/2		11/10/2015 10:38	1	V60001.D	RXI-5Sil MS 0.25(mm)
CCVIS 480-273999/3		11/10/2015 11:07	1	V60002.D	RXI-5511 MS 0.25(mm)
RL 480-273999/4		11/10/2015 11:36	1		RXI-5Sil MS 0,25(mm)
CCV 480-273999/5		11/10/2015 12:05	1		RXI-5S11 MS 0,25(mm)
ZZZZZ		11/10/2015 12:34	1		RMI-5Sil MS 0.25(mm)
22222		11/10/2015 13:03	1		RXI-5Sil MS 0.25(mm)
ZZZZZ		11/10/2015 13:32	1		RXI-5511 MS 0.25(mm)
ZZZZZ		11/10/2015 14:00	1		RXI-5S11 MS 0.25 (mm)
22222		11/10/2015 14:29	1		RXI-5Sil MS 0.25(mm)
22222		11/10/2015 14:58	1		RXI-5S11 MS 0.25(mm)
ZZZZZ		11/10/2015 15:27	1		RXI-5511 MS 0.25(mm)
ZZZZZ		11/10/2015 15:56	1		RXI-5Sil MS 0,25(mm)
ZZZZZ		11/10/2015 16:25	1		RXI-5Sil MS 0.25(mm)
XXXZZ		11/10/2015 16:54	1		RXI-5Sil MS 0.25(mm)
480-89467-2	WW-02-030515-1557	11/10/2015 17:23	20	V60015.D	RXI-5Sil MS 0,25(mm)
480-89467-5	WW-01-030515-1352	11/10/2015 17:52	20	V60016.D	RWI-5Sil MS 0.25(mm)
480-89467-6	WW-01-042815-1600	11/10/2015 18:21	20	V60017.D	RXI-5S11 MS 0.25(mm)
480-89467-8	WW-01-050715-1600	11/10/2015 18:50	20	V60018.D	RXI-5Sil MS 0.25(mm)
480-89467-10	P-01-030515-1557	11/10/2015 19:19	20	V60019.D	RXI-5Si1 MS 0.25(mm)
480-89467-13	P-01-051315-1530	11/10/2015 19:48	20	V60020.D	RXI-5811 MS 0.25(mm)
480-89467-18	P-01-101514-0910	11/10/2015 20:17	20	V60021.D	RXI-5Sil MS 0.25(mm)
480-89467-19	P-01-100814-1120	11/10/2015 20:46	20	V60022.D	RXI-5Sil MS 0.25(mm)
480-89467-20	P-01-013015-0915	11/10/2015 21:15	20	V60023.D	RXI-5Sil MS 0.25(mm)

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Lab Name: TestAmerica Buffalo

SDG No.:

Instrument TD: HP5973V

Analysis Batch Number: 274392

Start Date: 11/11/2015 12:20

End Date: 11/11/2015 22:57

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
DETER 480-274392/2		11/11/2015 12:20	1	V60043.D	RXI-5Sil MS 0.25(mm)
CCVIS 480-274392/3		11/11/2015 12:49	1	V60044.D	RXI-5Sil MS 0.25(mm)
RL 480-274392/4		11/11/2015 13:18	1		RXI-5S11 MS 0,25/mm)
480-89467-6 DL	WW-01-042815-1500 DL	11/11/2015 13:47	100	V60046.D	RXI-5Sil MS 0,25(mm)
480-89467-8 DL	WW-01-050715-1600 DL	11/11/2015 14:16	100	V60047.D	RXI-5Sil MS 0.25(mm)
480-89467-20 DL	P-01-013015-0915 DL	11/11/2015 14:45	100	V60048.D	RXI-5Sil MS 0.25(mm)
CCV 480-274392/8		11/11/2015 15:14	1		RXI-5Sil MS 0.25(mm)
ZZZZZ		11/11/2015 15:43	1.		RXI-5Sil MS 0.25(mm)
22222	1	11/11/2015 16:12	1		RXI-5Sil MS 0.25(mm)
22222		11/11/2015 16:41	1		RXI-5S11 MS 0.25(mm)
ZZZZZ		11/11/2015 17:10	1		RMI-5Sil MS 0,25(mm)
ZZZZZ		11/11/2015 17:39	1		RXI-5Sil MS 0.25(mm)
ZZZZZ		11/11/2015 18:08	1		RXI-5Sil MS 0.25(mm)
XXZZZ		11/11/2015 18:37	1		RXI-5Sil MS 0.25(mm)
ZZZZZ		11/11/2015 19:06	1		RXI-5Sil MS 0,25(mm)
22222		11/11/2015 19:35	1		RMI-5Sil MS 0.25(mm)
ZZZZZ		11/11/2015 20:04	1		RXI-5Sil MS 0,25(mm)
22222		11/11/2015 20:33	1		RXI-5Sil MS 0.25(mm)
22222		11/11/2015 21:02	1		RXI-5Sil MS 0,25(mm)
ZZZZZ		11/11/2015 21:31	1		RXI-5811 MS 0.25(mm)
ZZZZZ		11/11/2015 22:00	1		RXI-5Sil MS 0.25(mm)
ZZZZZ		11/11/2015 22:28	1		RXI-5Sil MS 0.25(mm)
22222		11/11/2015 22:57	1		RXI-5Sil MS 0.25(mm)

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Lab Name: TestAmer	ica Buffalo	Job No.: 480-89467-1	
SDG No.:			
Instrument ID: HP5	973X	Start Date: 10/23/2015 08:06	
Analysis Batch Numl	per: 270613	End Date: 10/23/2015 11:46	

LAB SAMPLE ID	CLIENT SAMPLE 1D	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
DETER 480-270613/2		10/23/2015 08:06	1	K009013898.D	RXI-5311 MS 0.25(mm)
IC 480-270613/3		10/23/2015 08:33	1	X009013899.D	RXI-5511 MS 0.25(mm)
IC 480-270613/4		10/23/2015 09:00	1	X009013900.D	REI-5S11 MS 0.25(mm)
TCIS 460-270613/5		10/23/2015 09:27	1	K009013901.D	RXI-5Sil MS 0,25(mm)
1C 480-270613/6		10/23/2015 09:54	1	X009013902.D	RXI-5Sil MS 0.25(mm)
IC 480-270613/7		10/23/2015 10:21	1	X009013903.D	RXI-5Sil MS 0.25(mm)
IC 480-270613/8		10/23/2015 10:48	1	X009013904.D	RXI-5511 MS 0.25(mm)
ICV 480-270613/9		10/23/2015 11:46	1		REI-5Sil MS 0.25 (mm)

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Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1	
SDG No.:		
Instrument ID: HP5973X	Start Date: 11/05/2015 10:14	
Analysis Batch Number: 273506	End Date: 11/05/2015 20:33	

LAB SAMPLE ID	CLIENT SAMPLE 1D	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
DFTPP 480-273506/2		11/05/2015 10:14	1	K009014094.D	RXI-5511 MS 0.25(mm)
CCVIS 480-273506/3		11/05/2015 10:42	1	X009014095.D	RXI-5511 MS 0.25(mm)
RL 480-273506/11		11/05/2015 14:19	1		RXI-5811 MS 0.25(mm)
22222		11/05/2015 14:46	25		RXI-5S11 MS 0,25(mm)
ME 480-273073/1-A		11/05/2015 15:13	1	X009014105.D	RXI-5Sil MS 0.25(mm)
LCS 480-273073/2-A		11/05/2015 15:40	1	K009014106.D	RXI-5Sil MS 0.25(mm)
LCSD 480-273073/3-A		11/05/2015 16:07	1	X009014107.D	RXI-5511 MS 0.25(mm)
480-89467-14	OS-01-031815-1530	11/05/2015 16:34	100	X009014108.D	RXI-5Sil MS 0.25(mm)
480-89467-15	GS-01-042415-1600	11/05/2015 17:01	10	X009014109.D	RXI-5Sil MS 0.25(mm)
480-89467-16	OS-01-042815-1600	11/05/2015 17:28	200	X009014110.D	RXI-5S11 MS 0.25(mm)
480-89467-17	os-01-050715-1630	11/05/2015 17:55	100	K009014111.D	RXI-5Sil MS (0.25(mm)
480-89467-22	05-01-101514-0910	11/05/2015 18:21	100	K009014112.D	RXI-5Sil MS 0.25(mm)
22222		11/05/2015 18:47	1		RXI-5Sil MS 0,25(mm)
22222		11/05/2015 19:14	1		RXI-5Sil MS 0.25(mm)
ZZZZZ		11/05/2015 19:40	1		RXI-5Sil MS 0,25(mm)
22222		11/05/2015 20:06	1		RMI-5Sil MS 0.25(mm)
ZZZZZ		11/05/2015 20:33	1		RXI-5S11 MS 0.25(mm)

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GC/MS SEMI VOA BATCH WORKSHEET

Lab Name: TestAmerica Buffalo

ffalo Job No.: 480-89467-1

Batch Start Date: 11/04/15 13:44

Batch Analyst: Myers, Carmela A

Batch Method: 3580A

Batch Number: 273073

SDG No.:

Batch End Date:

Lab Sample ID	Lab Sample ID Client Sample ID	Method	n Basis	InitialAmount	FinalAmount	0.8270/625105	0.8270surr 00036
MB 480-273073/1		3580A, 8270D	6	0.10 g	J. W.L.		1 mL
LCS 480-273073/2		3580A, 8270D	5	0.10 g	3 107	百十	2 m2
480-273073/3		3580A, 8270D		0.10 ¢	7 w.r	1 m.L	1.007.
480-89467-A-14	480-89467-A-14 OS-01-031815-153	3 3580A, 8270D	H	+0.13 g	T mT		I.m.D
480-89467-A-15	480-89467-A-15 OS-01-042415-160	3580A, 8270D	T.	+0.11 g	7 007		J. W.C.
480-89467-A-16	489-89467-A-16 OS-01-042815-160	3580A, 8270D	T.	+0.12 9	J mE		I mL
480-89467-A-17	480-89467-A-17 0S-01-050715-163	3580A, 8270D	1	+0.12 g	ZE Z		T m T
480-89467-A-22	480-89467-A-22 OS-01-101514-091	3580A, 8270D	I.	+0.13 9	1 11		1 m2

	Batch Notes	
Balance ID	40029	
Prep Solvent Volume Used	20 mL	
Solvent Lot *	3061608	
Solvent Name	Rec12	
Person who performed Spike	CM	
Vial Lot Number	82.58.00	

Basis Basis Description
T Total/NA

The pound sign (*) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

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Job No.: 480-89467-1

SDG No.:

Lab Name: TestAmerica Buffalo

Batch Analyst: Hartigan, Connor P 12:32 Batch Start Date: 11/06/15 Batch Number: 273586

Batch Method: 3510C

Batch End Date:

Lab Sample ID	Client Sample ID	Method Chain	8 9818	ReceivedpH	GrossWeight	TareWeight	InitialAmount	FinalAmount	FirstAdjustpH
MB 480-273586/1		3510C, 8270D		IS L			25C mL	I mL	<2 su
LCS 480-273586/2		3510C, 8270D		7.80			250 mL	1 mE	<2: su
480-89467-B-2	WW-02-030515-155	3510C, 8270D	Ļ	3 80	439,2 g	181.2 g	258 mL	1 mil	C2 S1
480-89467-8-5	WM-01-030515-135	35102, 8270D	F-4	ns e	440.6 9	181.7 g	258.9 mL	3 mg	42.51
480-89467-B-6	WW-01-042815-150	3510C, 8270D	£.	3 SII	440,1 g	180.4 g	259.7 mL	I ME	<2 SU
480-89467-B-8	WW-01-050715-160	3510C, 8270D	1	3 80	438,6 g	179.5 g	259.1 mL	1 mL	<2 80
480-89467-B-10	480-89467-B-10 P-01-030515-1557	3510C, 8270D	Đ	3 Su	443,2 g	185.7 g	257,5 mL	1 mL	<2 50
480-89467-B-13	P-01-051315-1530	3510C, 8270D	E	ns ¥	422,3 g	179.9 9	242.4 mL	1 mL	0.8 2>
480-89467-B-18	P-01-101514-0910	3510C, 8270D	Ę-	7 Su	445.7 9	178.7 g	267 mL	1 mt	<2. Str
480-89467-B-19	480-89467-B-19 P-01-100814-1120	3510C, 8270D	4	DS L	436,7 g	179.2 g	257.5 mL	1 mL	<2. SU
480-89467-B-20	480-89467-B-20 P-01-013015-0915	3510C, 8270D	40	3 Str	437.1 0	181.6 4	255.5 mL	1 mL	<22 SU

The pound sign (*) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

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		Batch Analyst: Hartigan, Connor B
Job No.: 480-89467-1		Batch Start Date: 11/06/15 12:32
Lab Name: TestAmerica Buffalo	SDG No.:	Batch Number: 273586

Batch End Date:

Batch Method: 35100

AnalysisComment	Density = 1,00
0.8270LLsurr 00034	I ml
0.8270LL LCS	
SecondAdjustpH	>11 80
8 3818	4
Method Chain	
Client Sample ID	P-01-013015-09
Lab Sample ID	B-20

E E	Batch Notes
Acid used for pH adjustment	1:1 Sulfacio
Acid used for pH adjust Lot #	2810093
Balance ID	1125012502
Base used for pH adjustment	Sodium Hydroxide
Base used for pH adjust Lot #	3021633
Person's name who did the concentration	书
Final Concentrator Volume	1 mL
Glass Wool ID	11414001
Na2SO4 Lot Number	2858178
pH Paper Lot Number	HC554612
Pipette In	024885D Tip Lot # E1605931
Prep Solvent Lot #	3076037
Prep Solvent Name	NeC12
Prep Solvent Volume Used	120 mL
Person's name who did the prep	CH, TL
Person's name who witnessed reagent drop	苦
Person who performed Spike	哲
Person who witnessed spiking	哲
Sufficient volume for MS/MSD?	YES
Vial Lot Number	662600

s Description	
Basi	Total/NA
Basis	T

The pound sign (*) in the amount added Eleid denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

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Method 8021B

Volatile Organic Compounds (GC) by Method 8021B

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FORM II GC VOA SURROGATE RECOVERY

Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1	
SDG No.:		
Matrix: Water	Level: Low	

GC Column (1); RTX-VGC ID: 0.53(mm)

Client Sample ID	Lab Sample ID	TFT1 #	BFB1
WW-01-101514-1120	480-89467-1	139	122
WW-01-031915-1550	480-89467-3	138	125
WW-01-041415-1640	480-89467-4	104	96
ww-01-050615-1552	480-89467-7	125	116
WW-01-052015-1500	480-89467-9	109	91
P-01-031315-1531	480-89467-11	94	88
P-01-050615-1552	480-89467-12	1,35	123
P-01-040115-1600	480-89467-21	131	125
P-01-012215-0948	480-89467-23	124	114
WW-01-031315-1531	480-89467-24	146 X	126
	MB 480-273207/3	128	123
	LCS 480-273207/4	127	119
	LCSD 480-273207/5	133	125

TFT = a,a,a-Triffuorotoluene 63-145
BFB = 4-Bromofluorobenzene 64-141

Column to be used to flag recovery values

FORM II 8021B

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FORM IV GC VOA METHOD BLANK SUMMARY

Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1
SDG No.:	
Lab Sample ID: ME 480-273207/3	
Matrix: Water	Date Extracted: 11/05/2015 08:28
Lab File ID: (1) 3_69023.D	Lab File ID: (2) 3_69023.D
Date Analyzed: (1) 11/05/2015 08:28	Date Analyzed: (2) 11/05/2015 08:28
Instrument ID: (1) HP5890-3	Instrument ID: (2) HP5890-3
GC Column: (1) RTX-VGC ID: 0.53 (mm)	GC Column: (2) RTX-VGC ID: 0.53(mm)

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES:

CLIENT SAMPLE ID	LAB SAMPLE ID	DATE ANALYZED	1	DATE ANALYZE	
	LCS 480-273207/4	11/05/2015	09:00	11/05/2015	09:00
	LCSD 480-273207/5	11/05/2015	09:31	11/05/2015	09:31
WW-01-101514-1120	480-89467-1	11/05/2015	11:33	11/05/2015	11:33
WW-01-031915-1550	480-89467-3	11/05/2015	12:05	11/05/2015	12:05
WW-01-041415-1640	480-89467-4	11/05/2015	12:38	11/05/2015	12:38
WW-01-050615-1552	480-89467-7	11/05/2015	13:10	11/05/2015	13:10
P-01-031315-1531	480-89467-11	11/05/2015	15:10	11/05/2015	15:10
P-01-050615-1552	480-89467-12	11/05/2015	16:14	11/05/2015	16:14
P-01-040115-1600	480-89467-21	11/05/2015	16:45	11/05/2015	16:45
WW-01-052015-1500	480-89467-9	11/05/2015	18:41	11/05/2015	18:41
P-01-012215-0948	480-89467-23	11/05/2015	19:13	11/05/2015	19:13
WW-01-031315-1531	480-89467-24	11/05/2015	19:44	11/05/2015	19:44

FORM IV 8021B

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Lab Name: TestAmerica Buffalo

SDG No.:

Client Sample ID: WW-01-101514-1120

Lab Sample ID: 480-89467-1

Instrument ID (1): HP5890-3

Date Analyzed (1): 11/05/2015 11:33

GC Column (1): RTX-VGC

ID: 0.53(num)

Job No.: 480-89467-1

Instrument ID (2): HP5890-3

Date Analyzed (2): 11/05/2015 11:33

GC Column (2): RTX-VGC

ID: 0.53(num)

ANALYTE	COT	COL PEAK	RT	RT WINDOW		CONCENTRATION		RPD
MADITE	JOH PEAK	PAZ.	FROM	TO	PEAK.	MEAN	RED	
Benzene	1		3.49	3.42	3.56	320		44.7
	2		4.17	4.10	4.24	200		
Toluene	1		5.17	5.09	5.23	11		143.4
	2		6.36	6.28	6,42	65		

FORM X 8021B

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Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1					
SDG No.:						
Client Sample ID: WW-01-031915-1550	Lab Sample ID: 480-89467-3					
Instrument ID (1): HP5890-3	Instrument ID (2): HP5890-3					
Date Analyzed (1): 11/05/2015 12:05	Date Analyzed (2): 11/05/2015 12:05					
GC Column (1): RTX-VGC ID: 0.53(mm)	GC Column (2): RTX-VGC ID: 0.53(mm)					

ANALYTE	COL	PEAK	RT	RT WI		CONCENTRATION		RPD
ANALITE	COL	PEAN	P, 1	FROM	TO	PEAK.	MEAN	RPD
Benzene	1		3.50	3.42	3.56	1500		27.6
	2		4.17	4.10	4.24	1200		
Toluene	1		5.17	5.09	5.23	240		443
	2		6.35	6.28	6,42	380		
m,p-Xylene	1		7.86	7.76	7.90	75		193.7
	2		9.97	9.91	10.05	4700		100

Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1					
SDG No.:						
Client Sample ID: WW-01-041415-1640	Lab Sample ID: 480-89467-4					
Instrument ID (1): HP5890-3	Instrument ID (2): HP5890-3					
Date Analyzed (1): 11/05/2015 12:38	Date Analyzed (2): 11/05/2015 12:38					
GC Column (1): RTX-VGC ID: 0.53(mm)	GC Column (2): RTX-VGC ID: 0.53(mm)					

ANALYTE	COL	PEAK	RT WINDOW		NDOW	CONCENTRATION		DDD
ANALITE	COL	PEAN	P, I	FROM	TO	PEAK.	MEAN	RPD
Benzene	1		3.50	3.42	3.56	1800		10.8
	2		4.18	4.10	4.24	2000		
Toluene	1		5.17	5.09	5.23	890		15.0
	2		6.36	6.28	6.42	1000		
Ethylbenzene	1		7.50	7.42	7.56	450		30.5
	2		9.64	9.55	9.69	620		100
m,p-Xylene	1		7.86	7.76	7.90	300		161.3
	- 2		9.97	9.91	10.05	2800		

Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1					
SDG No.:						
Client Sample ID: WW-01-050615-1552	Lab Sample ID: 480-89467-7					
Instrument ID (1): HP5890-3	Instrument ID (2): HP5890-3					
Date Analyzed (1): 11/05/2015 13:10	Date Analyzed (2): 11/05/2015 13:10					
GC Column (1): RTX-VGC ID: 0.53(mm)	GC Column (2): RTX-VGC ID: 0.53(mm)					

ANALYTE	COL	PEAK	RT	RT WINDOW		CONCENTRATION		DDD
ANALITE	COL	PEAN	P, I	FROM	TO	PEAK.	MEAN	RPD
Benzene	1		3.50	3.42	3.56	1900		13.0
	2		4.18	4.10	4-24	2100		
Toluene	1		5.17	5.09	5.23	1400		12.9
	2		6.36	6.28	6,42	1600		
Ethylbenzene	1		7.50	7.42	7.56	890		27.4
	2		9.64	9.55	9.69	1200		
m,p-Xylene	1		7.84	7.76	7.90	2200		77.0
	- 2		9.98	9.91	10.05	5000		

Lab Name: TestAmerica Buffalo

SDG No.:

Client Sample ID: WW-01-052015-1500

Lab Sample ID: 480-89467-9

Instrument ID (1): HP5890-3

Date Analyzed (1): 11/05/2015 18:41

GC Column (1): RTX-VGC

ID: 0.53(mm)

Job No.: 480-89467-1

Lab Sample ID: 480-89467-9

Instrument ID (2): HP5890-3

Date Analyzed (2): 11/05/2015 16:41

GC Column (1): RTX-VGC

ID: 0.53(mm)

ANALYTE	COL	PEAK	RT RT WI		NDOW	CONCENTRATION		RPD
ANALITE	COL	PLAN	P.1	FROM	TO	PEAK.	MEAN	RPD
Benzene	1		3.50	3.44	3.58	670		12.1
	2		4.18	4.11	4.25	590		
Toluene	1	-	5.17	5.10	5.24	37		40.4
	2		6.35	6.29	6,43	130		
m, p-Xylene	1		7.85	7.78	7.92	55		186.3
	2		9.96	9.94	10.08	1600		
o-Xylene	1		8.87	8.79	8.93	160		32.2
	- 2		11.04	10.92	11.06	220		

Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1					
SDG No.:						
Client Sample ID: P-01-031315-1531	Lab Sample ID: 480-89467-11					
Instrument ID (1): HP5890-3	Instrument ID (2): HP5890-3					
Date Analyzed (1): 11/05/2015 15:10	Date Analyzed (2): 11/05/2015 15:10					
GC Column (1): RTX-VGC ID: 0.53(mm)	GC Column (2): RTX-VGC ID: 0.53(mm)					

ANALYTE	COL	PEAK	RT	RT WINDOW		CONCENTRATION		DDD
ANALITE	COL	PEAN	P.I	FROM	TO	PEAK.	MEAN	RPD
Benzene	1		3.51	3.44	3.58	2400		111.7
	2		4.18	4.11	4.25	670		
Toluene	1		5.18	5.10	5.24	260		25.5
	2		6.36	6.29	6,43	200		
m,p-Xylene	1		7.91	7.78	7.92	110		175.4
	2		9.99	9.94	10.08	1700		1

Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1					
SDG No.:						
Client Sample ID: P-01-050615-1552	Lab Sample ID: 480-89467-12					
Instrument ID (1): HP5890-3	Instrument ID (2): HP5890-3					
Date Analyzed (1): 11/05/2015 16:14	Date Analyzed (2): 11/05/2015 16:14					
GC Column (1): RTX-VGC ID: 0.53(mm)	GC Column (2): RTX-VGC ID: 0.53(mm)					

ANALYTE	COL	PEAK	RT	RT WI	NDOW	CONCENTRATION		DDD
	COL	PEAN	P, I	FROM	TO	PEAK.	MEAN	RPD
Benzene	1		3.51	3.44	3.58	1400		45.9
	2		4.19	4.11	4.25	880		
Toluene	1	-	5.19	5.10	5.24	120		403
	2		6.37	6.29	6,43	190		
m,p-Xylene	1		7.89	7.78	7.92	50		194.7
	2		9.98	9.94	10.08	3800		1

Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1					
SDG No.:						
Client Sample ID: P-01-040115-1600	Lab Sample ID: 480-89467-21					
Instrument ID (1): HP5890-3	Instrument ID (2): HP5890-3					
Date Analyzed (1): 11/05/2015 16:45	Date Analyzed (2): 11/05/2015 16:45					
GC Column (1): RTX-VGC ID: 0.53(mm)	GC Column (2): RTX-VGC ID: 0.53(mm)					

ANALYTE	COL	PEAK	RT	RT WINDOW		CONCENTRATION		DDD
				FROM	TO	PEAK.	MEAN	RPD
Benzene	1		3.51	3.44	3.58	14000		50.5
	2		4.18	4.11	4.25	8100		
Toluene	1		5.18	5.10	5,24	55.00		11.0
	2		6.36	6.29	6,43	6100		
Ethylbenzene	1		7.51	7.44	7.58	3700		7.1
	2		9.64	9,57	9.71	3900		
m,p-Xylene	1		7.85	7.78	7.92	7700		47.1
	- 2		9.99	9.94	10.08	12000		

Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1				
SDG No.:					
Client Sample ID: P-01-012215-0948	Lab Sample ID: 480-89467-23				
Instrument ID (1): HP5890-3	Instrument ID (2): HP5890-3				
Date Analyzed (1): 11/05/2015 19:13	Date Analyzed (2): 11/05/2015 19:13				
GC Column (1): RTX-VGC ID: 0.53(mm)	GC Column (2): RTX-VGC ID: 0.53(mm)				

ANALYTE	COL	PEAK	RT	RT WINDOW		CONCENTRATION		RPD
				FROM	TO	PEAK.	MEAN	RPD
Benzene	1		3.51	3.44	3.58	160		156.5
	2		4.18	4.11	4.25	19		
Toluene	1	-	5.17	5.10	5.24	7.9		19.2
	2		6.35	6.29	6,43	9.6		
m,p-Xylene	1		7.85	7.78	7.92	6.8		168.7
	2		9.96	9.94	10.08	80		

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FORM X IDENTIFICATION SUMMARY

Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1
SDG No.:	
Client Sample ID: WW-01-031315-1531	Lab Sample ID: 480-89467-24
Instrument ID (1): HP5890-3	Instrument ID (2): HP5890-3
Date Analyzed (1): 11/05/2015 19:44	Date Analyzed (2): 11/05/2015 19:44
GC Column (1): RTX-VGC ID: 0.53(mm)	GC Column (2): RTX-VGC ID: 0.53(mm)

ANALYTE	COT	COL PEAK RT	D.M.	RT WINDOW		CONCENTRATION		DDD
ANALITE	COL		P, I	FROM	TO	PEAK.	MEAN	RPD
Benzene	1		3.51	3.44	3.58	12		47.1
	- 2		4.18	4.11	4.25	7.7		
Toluene	1		5.18	5.10	5,24	1.4		43.2
	2		6.35	6.29	6,43	2.1		
a-Xylene	1		8.87	8,79	8.93	3.7		26.9
	2		11.04	10.92	11.06	4.8		

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FORM X IDENTIFICATION SUMMARY

Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1				
SDG No.:					
Client Sample ID:	Lab Sample ID: LCS 480-273207/4				
Instrument ID (1): HP5890-3	Instrument ID (2): HP5890-3				
Date Analyzed (1): 11/05/2015 09:00	Date Analyzed (2): 11/05/2015 09:00				
GC Column (1): RTX-VGC ID: 0.53(mm)	GC Column (2): RTX-VGC ID: 0.53(mm)				

ANALYTE	COL	PEAK	RT	RT WINDOW		CONCENTRATION		RPD
ANALITE	COL	PLAN	P, I	FROM	TO	PEAK	MEAN	RED
Benzene	1		3.49	3.42	3.56	3,62		9.0
	2		4.17	4.10	4-24	3.96		
Toluene	1		5.17	5.09	5.23	3.52		10.3
	2		6.35	6.28	6,42	3,90		
Ethylbenzene	1		7.51	7.42	7.56	3.58		11.0
	2		9.64	9.55	9.69	3.99		
m,p-Xylene	1		7.86	7.76	7.90	7.32		8.8
	- 2		10.00	9.91	10.05	8.00		
o-Xylene	1		8.87	8.77	8.91	3.53		11.2
	2		10.99	10.90	11.04	3.95		

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FORM X IDENTIFICATION SUMMARY

Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1				
SDG No.:					
Client Sample ID:	Lab Sample ID: LCSD 480-273207/5				
Instrument ID (1): HP5890-3	Instrument ID (2): HP5890-3				
Date Analyzed (1): 11/05/2015 09:31	Date Analyzed (2): 11/05/2015 09:31				
GC Column (1): RTX-VGC ID: 0.53(mm)	GC Column (2): RTX-VGC ID: 0.53(mm)				

ANALYTE	COL	PEAK	RT	RT WINDOW		CONCENTRATION		RPD	
ANALITE	COL	PLAN	P, I	FROM	TO	PEAK.	MEAN	RED	
Benzene	1		3.49	3.42	3.56	3,63		10.0	
	2		4.17	4.10	4.24	4.02			
Toluene	1		5.16	5.09	5.23	3.49		12.2	
	2		6.35	6.28	6,42	3,95			
Ethylbenzene	1		7.51	7.42	7.56	3.63		9.9	
	2		9.63	9.55	9.69	4.01			
m,p-Xylene	1		7.85	7.76	7.90	7.43		7.8	
	2		10.00	9.91	10.05	8.04			
o-Xylene	1		8.86	8.77	8.91	3.56		11,6	
	2		10.98	10.90	11.04	4.00			

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Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1				
SDG No.:					
Client Sample ID: WW-01-101514-1120	Lab Sample ID: 480-89467-1				
Matrix; Water	Lab File ID: 3 69027.D				
Analysis Method: 8021B	Date Collected: 10/15/2014 11:20				
Sample wt/vol: 44(mL)	Date Analyzed: 11/05/2015 11:33				
Soil Aliquot Vol:	Dilution Factor: 200				
Soil Extract Vol.:	GC Column: RTX-VGC	ID: 0.53(mm)			
% Moisture:	Level: (low/med) Low				
Analysis Batch No.: 273207	Units: ug/L				

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
71-43-2	Benzene	320	H	40	4.7
108-88-3	Toluene	11	JH	40	7.1
100-41-4	Ethylbenzene	ND	H	40	5.7
179601-23-1	m,p-Xylene	ND	H	80	11
95-47-6	o-Xylene	ND	H	40	5.4
1330-20-7	Xylenes, Total	ND	H	120	11

CAS NO.	SURROGATE	%REC	Q	LIMITS
98-08-B	a,a,a-Trifluorotoluene	1 139		63-145
460-00-4	4-Bromofluorobenzene	122		64-141

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Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1				
SDG No.:					
Client Sample ID: WW-01-031915-1550	Lab Sample ID: 480-89467-3				
Matrix; Water	Lab File ID: 3 69028.D				
Analysis Method: 8021B	Date Collected: 03/19/2015 15:50				
Sample wt/vol: 44(mL)	Date Analyzed: 11/05/2015 12:05				
Soil Aliquot Vol:	Dilution Factor: 800				
Soil Extract Vol.:	GC Column: RTX-VGC ID: 0.53(mm)				
% Moisture:	Level: (low/med) Low				
Analysis Batch No.: 273207	Units: ug/L				

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
71-43-2	Benzene	1500	H	160	19
108-88-3	Toluene	240	H	160	28
100-41-4	Ethylbenzene	ND	H	160	23
179601-23-1	m,p-Xylene	75	JH	320	43
95-47-6	o-Xylene	ND	H	160	22
1330-20-7	Xylenes, Total	75	JH	480	43

CAS NO.	SURROGATE	%REC	Q	LIMITS
98-08-B	a,a,a-Trifluorotoluene	1 138		63-145
460-00-4	4-Bromofluorobenzene	125		64-141

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Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1		
SDG No.:			
Client Sample ID: WW-01-041415-1640	Lab Sample ID: 480-89467-4		
Matrix; Water	Lab File ID: 3 69029.D		
Analysis Method: 8021B	Date Collected: 04/14/2015 16:40		
Sample wt/vol: 44(mL)	Date Analyzed: 11/05/2015 12:38		
Soil Aliquot Vol:	Dilution Factor: 200		
Soil Extract Vol.:	GC Column: RTX-VGC ID: 0.53(mm)		
% Moisture:	Level: (low/med) Low		
Analysis Batch No.: 273207	Units: ug/L		

CAS NO.	COMPOUND NAME	RESULT	2	RL	MDL
71-43-2	Benzene	1800	H	40	4.7
108-88-3	Toluene	890	H	4.0	7.1
100-41-4	Ethylbenzene	450	H	40	5.7
179601-23-1	m,p-Xylene	300	H	80	11
95-47-6	o-Xylene	ND	H	40	5.4
1330-20-7	Xylenes, Total	300	н	120	11

CAS NO.	SURROGATE	%REC	Q	LIMITS
98-08-B	a,a,a-Trifluorotoluene	104		63-145
460-00-4	4-Bromofluorobenzene	96		64-141

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Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1		
SDG No.:			
Client Sample ID: WW-01-050615-1552	Lab Sample ID: 480-89467-7		
Matrix; Water	Lab File ID: 3 69030.D		
Analysis Method: 8021B	Date Collected: 05/06/2015 15:52		
Sample wt/vol: 44(mL)	Date Analyzed: 11/05/2015 13:10		
Soil Aliquot Vol:	Dilution Factor: 200		
Soil Extract Vol.:	GC Column: RTX-VGC ID: 0.53(mm		
% Moisture:	Level: (low/med) Low		
Analysis Batch No.: 273207	Units: ug/L		

CAS NO.	COMPOUND NAME	RESULT	2	RL	MDL
71-43-2	Benzene	1900	H	40	4.7
108-88-3	Toluene	1400	H	4.0	7.1
100-41-4	Ethylbenzene	890	H	40	5.7
179601-23-1	m,p-Xylene	2200	H	80	11
95-47-6	o-Xylene	ND	H	40	5.4
1330-20-7	Xylenes, Total	.2200	н	120	11

CAS NO.	SURROGATE	%REC	Q	LIMITS
98-08-B	a,a,a-Trifluorotoluene	1 125		63-145
460-00-4	4-Bromofluorobenzene	116		64-141

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Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1		
SDG No.:			
Client Sample ID: WW-01-052015-1500	Lab Sample ID: 480-89467-9		
Matrix; Water	Lab File ID; 3_69039.D		
Analysis Method: 8021B	Date Collected: 05/20/2015 15:00		
Sample wt/vol: 44(mL)	Date Analyzed: 11/05/2015 18:41		
Soil Aliquot Vol:	Dilution Factor: 200		
Soil Extract Vol.:	GC Column: RTX-VGC ID: 0.53(mm)		
% Moisture:	Level: (low/med) Low		
Analysis Batch No.: 273207	Units: ug/L		

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
71-43-2	Benzene	670	Н	40	4.7
108-88-3	Toluene	87	H	40	7.1
100-41-4	Ethylbenzene	ND	H	40	5.7
179601-23-1	m,p-Xylene	55	JH	80	11
95-47-6	o-Xylene	160	H	40	5.4
1330-20-7	Xylenes, Total	220	H	120	11

CAS NO.	SURROGATE	%REC	Q	LIMITS
98-08-8	a,a,a-Trifluorotoluene	109		63-145
460-00-4	4-Bromofluorobenzene	91		64-141

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Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1		
SDG No.:			
Client Sample ID: P-01-031315-1531	Lab Sample ID: 480-89467-11		
Matrix: Water	Lab File ID: 3 69033.D		
Analysis Method: 8021B	Date Collected: 03/13/2015 15:31		
Sample wt/vol: 44(mL)	Date Analyzed: 11/05/2015 15:10		
Soil Aliquot Vol:	Dilution Factor: 2000		
Soil Extract Vol.:	GC Column: RTX-VGC ID	: 0.53(mm)	
% Moisture:	Level: (low/med) Low		
Analysis Batch No.: 273207	Units: ug/L		

CAS NO.	COMPOUND NAME	RESULT	2	RL	MDL
71-43-2	Benzene	2400	Н	400	47
108-88-3	Toluene	260	JH	400	71
100-41-4	Ethylbenzene	ND	H	400	57
179601-23-1	m,p-Xylene	110	JH	800	110
95-47-6	o-Xylene	ND.	H	400	54
1330-20-7	Xylenes, Total	110	JH	1200	110

CAS NO.	SURROGATE	%REC	Q.	LIMITS
98-08-B	a,a,a-Trifluorotoluene	94		63-145
460-00-4	4-Bromofluorobenzene	88		64-141

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Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1		
SDG No.:			
Client Sample ID: P-01-050615-1552	Lab Sample ID: 480-89467-12		
Matrix; Water	Lab File ID: 3 69035.D		
Analysis Method: 8021B	Date Collected: 05/06/2015 15:52		
Sample wt/vol: 44(mL)	Date Analyzed: 11/05/2015 16:14		
Soil Aliquot Vol:	Dilution Factor: 400		
Soil Extract Vol.:	GC Column: RTX-VGC ID: 0,53(mm		
% Moisture:	Level: (low/med) Low		
Analysis Batch No.: 273207	Units: ug/L		

CAS NO.	COMPOUND NAME	RESULT	2	RL	MDL
71-43-2	Benzene	1400	H	80	9.3
108-88-3	Toluene	120	H	80	1.4
100-41-4	Ethylbenzene	ND	H	80	11
179601-23-1	m,p-Xylene	50	JH	160	22
95-47-6	o-Xylene	ND	H	80	11
1330-20-7	Xylenes, Total	5.0	JH	240	22

CAS NO.	SURROGATE	%REC	Q	LIMITS
98-08-B	a,a,a-Trifluorotoluene	135		63-145
460-00-4	4-Bromofluorobenzene	123		64-141

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Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1		
SDG No.:			
Client Sample ID: P-01-040115-1600	Lab Sample ID: 480-89467-21		
Matrix; Water	Lab File ID: 3 69036.D		
Analysis Method: 80218	Date Collected: 04/01/2015 16:00		
Sample wt/vol: 44(mL)	Date Analyzed: 11/05/2015 16:45		
Soil Aliquot Vol:	Dilution Factor: 800		
Soil Extract Vol.:	GC Column: RTX-VGC ID: 0.53(mm)		
% Moisture:	Level: (low/med) Low		
Analysis Batch No.: 273207	Units: ug/L		

CAS NO.	COMPOUND NAME	RESULT	2	RL	MDL
71-43-2	Benzene	14000	H	160	19
108-88-3	Toluene	5500	H	160	28
100-41-4	Ethylbenzene	3700	H	160	23
179601-23-1	m,p-Xylene	7700	H	320	43
95-47-6	o-Xylene	ND	H	160	22
1330-20-7	Xylenes, Total	7.700	H	480	4.3

CAS NO.	SURROGATE	%REC	Q	LIMITS
98-08-8	a,a,a-Trifluorotoluene	131		63-145
460-00-4	4-Bromofluorobenzene	125		64-141

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Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1	
SDG No.:		
Client Sample ID: P-01-012215-0948	Lab Sample ID: 480-89467-23	
Matrix; Water	Lab File ID: 3 69040.D	
Analysis Method: 80218	Date Collected: 01/22/2015 09:48	
Sample wt/vol: 44(mL)	Date Analyzed: 11/05/2015 19:13	
Soil Aliquot Vol:	Dilution Factor: 800	
Soil Extract Vol.:	GC Column: RTX-VGC ID: 0.53(m	am)
% Moisture:	Level: (low/med) Low	
Analysis Batch No.: 273207	Units: ug/L	

CAS NO.	COMPOUND NAME	RESULT	2	RL	MDL
71-43-2	Benzene	160	H	3.6	0.42
108-88-3	Toluene	7.9	H	3.6	0.65
100-41-4	Ethylbenzene	ND	H	3.6	0.52
179601-23-1	m,p-Xylene	6.8	JH	7.3	0.98
95-47-6	o-Xylene	ND	H	3.6	0.49
1330-20-7	Xylenes, Total	6.8	JH	11	0.98

CAS NO.	SURROGATE	%REC	Q	LIMITS
98-08-8	a,a,a-Trifluorotoluene	1 124	124	
460-00-4	4-Bromofluorobenzene	114		64-141

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Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1		
SDG No.:			
Client Sample ID: WW-01-031315-1531	Lab Sample ID: 480-89467-24		
Matrix: Water	Lab File ID: 3 69041.D		
Analysis Method: 8021B	Date Collected: 03/13/2015 15:31		
Sample wt/vol: 44(mL)	Date Analyzed: 11/05/2015 19:44		
Soil Aliquot Vol:	Dilution Factor: 200		
Soil Extract Vol.:	GC Column: RTX-VGC ID: 0.53(mm)		
% Moisture:	Level: (low/med) Low		
Analysis Batch No.: 273207	Units: ug/L		

CAS NO.	COMPOUND NAME	RESULT	0	RL	MDL
71-43-2	Benzene	12	H	0.91	0.11
108-88-3	Toluene	1.4	H	0.91	0.16
100-41-4	Ethylbenzene	ND	H	0.91	0.13
179601-23-1	m,p-Xylene	ND	H	1,8	0.25
95-47-6	o-Xylene	3.7	H	0.91	0.12
1330-20-7	Xylenes, Total	3.7	н	2.7	0.25

CAS NO.	SURROGATE	%REC	Q	LIMITS
98-08-B	a,a,a-Trifluorotoluene	146	X	63-145
460-00-4	4-Bromofluorobenzene	126	-	64-141

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FORM VI 8021B

FORM VI GC VOA BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA RETENTION TIME SUMMARY

Lab Name: TestAmerica Buffalo SDG No.:	Job No.: 480-89467-1	Analy Batch No.: 262944
Instrument ID: HP5890-3	GC Column: RIX-VGC ID: 0.53(mm)	Heated Furge: (Y/N) N
Calibration Start Date: 09/10/2015 17:44	Calibration End Date: 09/10/2015 19:52	Calibration ID: 2488

EVEL:	LAB SAMPLE ID:	LAB FILE ID:	
Level 1		\$ 67061.D	
Level 3	STD2 480-262944/3	3 67062.D	
Level 3	STD3 480-262944/4	3 67063.D	
Level 4	STD4 480-262944/5	3 67064.D	
Level 5	STDS 480-26294476	3 67065,D	

ANALYTE	LVL 1	LVL 2	LVL 3	LVI 4	LVL 5	RT WINDOW	AVG RT
Methyl terr-butyl ether	2.237	2,233	2.233	2.233	2,227	2,163 - 2,303	3 2.233
Benzene	3.487	8.483	3.480	3,480	3,477	34410 - 34550	3.48
Toluene	8.163	5.153	5.147	5.143	8.140	5,077 - 5,217	5,149
Ethylbenzene	7,527	7.507	7.497	7.490	7,487	7.567 - 7.567	7.50
m, p-Xylene	7.867	7,843	7.833	7.827	7.823	7,763 - 7,903	3. 7.839
o-Xylene	8.877	8.860	8.847	8.840	8.837	8.917	7 8.852
Isopropylbensene	012.6	9.707	9.897	069.6	069.6	9,627 - 9,767	9.699
n-Propylbenzene	10.827	10.817	10.803	10.797	10,793	10,733 - 10,873	73 10,807
1, 3, 5-Trimethylbenzene	11.497	11.427	11.413	11.407	11.403	11,343 - 11,483	83 11,429
tert-Butylbenzene	12.230	12,223	12,213	12,207	12.207	12,143 - 12,283	83 12.216
1, 2, 4-Trimethylbenzene	12.473	12.453	32.440	32,430	12,430	12,370 - 12,510	12,445
sec-Butylbenzene	12.743	12,730	12,720	12.713	12,713	12.650 - 12.790	30 12,724
4-Isopropyltoluene	13,237	13,223	13,210	13,203	13,203	13,140 - 13,280	30 13,215
n-Butylbenzene	14,463	14,417	14.400	14,390	14,390	14,330 - 14,470	70 14,412
Naphthalene	17.693	17,630	27.617	37.610	17,610	17,547 - 17,687	87 17.632
a, a, a-Trifluorotoluene	4.407	4.407	4.407	4.407	4.400	4.337 - 4.477	4.406
4-Bromofluorobenzene	10,833 10,837		10.330 10.323		10,320	10,260 - 10,400	30 10,329

GC VOA BY EXTERNAL STANDARD - INLTIAL CALIBRATION DATA. CURVE EVALUATION

Lab Name: TestAmerica Buffalo	Buffalo		Job No.: 480-89467-1	1-19468-08			Analy Batch No.: 262944
SDG No.:							
Instrument ID: HP5890-3			GC Column:	RIX-VGC	GC Column: RIX-VGC ID: 0.53(mm)	13	Heated Furge: (Y/N) N
Calibration Start Date: 09/10/2	e: 09/10/2015	2015 17:44	Calibratio	n End Date:	Calibration End Date: 09/10/2015 19:52	19:52	Calibration ID: 24884

Calibration Files:

LEVEL:	LAB S	AMPLE ID:	LAB FILE ID:
Level 1	STDI	480-262944/2	€ 67061.0
Level 3	STDS	STD2 480-262944/3	3 67062.1
Level 3	STD3 4	480-262944/4	S 67063.D
Level 4	STD4 4	480-262944/5	3 67064.D
Level 5	STDS	480-26294476	3 67065.D

ANALYTE		10		D.	CURVE		COLFFICIENT		# MIN CE	F SRSD	***	MAX R-2	iles.	MIN Rol
	LVL L	LVL 2	INT 3	EVL 4	H A A	а	MI	MS			9E	ERSE OR COD	8	08 000
Methyl test-butyl ether	8589.9	8410.5	7998.3	9278.6 A	Ave		8724.47333			9.9		20.0		
Benzene	24788	25301	23646	25828 A	Ave		25506.6367			07		20.0		
Toluene	25595	23836	22086	24219 A	Ave		23817,9633			in in		20.0		
Sthylbenzene	20930	20977	19896	21701 A	Ave		20867.1133			(X)		20.0	H	
m,p-Xylene	25063	24665	22651	24684 A	Ave		24188.3350			4.0		20,0		
o-Xylene	22140	20892	19823	21931 A	Ave		21131,9733			4.5	ŕ	20.0		
Isopropylbenzene	20310	17854	16934	18780 Ave	di N		18327.7500			7.0		0.02		
n-Fropylbenzene	27335	18889	18394	20228 L	riul 1	1353,79539	19414.4223					0,9990	05	0066"0
1, 3, 5-Trimethylbenzene	29340	31399	27729	30570 Lin1		6536,88940	29224.1117					0.9990	06	0.9900
tert-Butylbenzene	15910	19709	14808	16599 A	Ave		16019.0667			4.		20.0		
1, 2, 4-Trimethylbenzene	22543	55598	21152	23465 A	Ave		22305.5733			(C)	Ħ	20.0		
sec-Butylbenzene	17352	17849	16259	18165 A	Ave		17748.0067			on on		20.0		
-Isopropyltoluene	15970	17051	15910	17762 A	Ave		16733.9100			417		20.0		
n-Batylbenzene	14175	17555	16599	18724 A	Ave		17020,5633			10.4		20.0		
Naphthal ene	12330	10700	11359	13328 Lin		1462.3630	-1462.3688 12419.1405					0.3970	10	0.9960

Note: The mi coefficient is the same as Ave Of for an Ave curve type.

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GC VOA BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA. CURVE EVALUATION

Lab Name: TestAmerica Buffalo SDG No.:	Job No.: 480-89467-1		Analy Batch No.: 262
Instrument ID: HP5890-3	GC Column: RIX-VGC ID: 0.53(mm)	.53 (mm)	Heated Furge: (Y/N)
Calibration Start Date: 09/10/2015 17:44	Calibration End Date: 09/10/2015	2015 19:52	Calibration ID:

mer		200			CHIDITIC		ment or transport		a comme	DEATH OF DAY	3	The Alexander	-	2000
		909			-UKVA		CODESTCIENT		N. C.	N W W		MAA E	=	MIN N. Z
	LVL 1 LVL 5	LVL 2	LVL 3	LVL 4	TYPE	В	M	MZ			(Q)	OR COD		900
Φ.	11509	11458	9234,6	8494.4 Ave	Ave		10459.2889			14.2	20,0	0		
	27078	27004	22350	20256 Ave	Ave		24835,2444			m m	20.0	0		

Note: The mi coefficient is the same as Ave GF for an Ave curve type, ECRM VI 8021B

FORM VI GC VOA BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Buffalo SDG No.:	iffalo	Job No.: 480-89467-1		Analy Batch No.: 262944
Instrument ID: HP5890-3		GC Column: RIX-VGC	ID: 0.53(mm)	Heated Furge: (I/N) N
Calibration Start Date: 09/10/2	015 17:44	Calibration End Date: 09/10/2015 19:52	09/10/2015 19:52	Calibration ID: 248

MPLE ID: LAB FILE ID: 86701.D \$ 6701.D \$ 6705.D
D 62065 DAY / E

ANALYTE	CURVE			RESPONSE				CONCE	CONCENTRATION	(ne/rr)	
	TYPE	EVE 1	LVL 2	LVL 3	LVL 4	LVL 5	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5
Methyl tert-butyl ether	AVE	1369	33642	159966	278359	515396	0.200	4.00	20.0	30.0	60.09
Benzene	Ave	5534	101202	472923	774848	1487296	0.200	4.00	20.0		0.03
Toluene	Ave	5139	95344	441714	726583	1395221	0.200	4.00	20,0	30.0	0.09
Ethylbenzene	Ave	4186	83908	397918	651025	1249928	0.300	4.00	20.0	30.0	60.0
m, p-Xylene	Ave	10025	197317	906044	1481038	2865538	0.400	8.00	40.0	0.09	120
o-Xylene	Ave	4428	83581	396466	657942	1252195	0.200	4.00	20.0	30.0	0.09
Isopropylbenzene	Ave	4062	70.618	338686	563397	1077648	0.200	4.00	20.0	30.0	0.03
n-Fropylbengene	Turi	5467	75555	367876	606844	1158154	0.200	4.00	20.0	30.0	0.09
1, 3, 5-Trimethylbenzene	Lini	12411	125596	554580	917104	1760387	0.200	4.00	20.0	30.0	0.09
tert-ButyIbenzene	Ave	3414	62834	296153	497979	954593	0,300	4.00	20.0	30.0	60.0
1, 2, 4-Trimethylbenzene	Ave	4.954	90393	423036	703955	1352559	0.200	4.00	20.0	30.0	0.09
sec-Butylbenzene	Ave	3823	71395	325179	544959	1041122	0.200	4.00	20.0	30.0	0.09
4-Isopropyltoluene	Ave	3194	68203	318204	532862	1018592	0.200	4.00	20.0	30,0	0.09
n-Butylbenzene	Ave	2835	70221	331979	561709	1082999	0.200	4.00	20.0	30.0	0.09
Naphthalene	Linl	1311	42738	227182	399843	739820	0.350	4.00	20.0	30.0	60.03
a, a, a-Trifluorotoluene	Ave	207162	206249	166223	152900	208802	18.0	18.0	18.0	18.0	18.0
4-Bromofluorobenzene	Ave	487406	486366	402305	364605	494790	18.0	18.0	18.0	39.0	18.0

Curve Type Legend:
Ave = Average
Lin1 = Linear 1/conc

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FORM VI GC VOA BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA RETENTION TIME SURMARY

Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1	Analy Batch No.: 262944
SDG No.:		
Instrument ID: HP5890-3	GC Column: RIX-VGC ID: 0.53(nm)	Heated Furge: (Y/N) N
Calibration Start Date: 09/10/2015 17:44	Calibration End Date: 09/10/2015 19:52	Calibration ID: 24885

ANALYTE	LVL 1	LVL 2	LVL 3	LVL 4	DVL S	RT WINDOW	AVG RT
Methyl terr-butyl ether	2,717	2,713	2,717	2.713	2,710	2,647 - 2,787	2.714
Benzene	4.163	4.163	4.163	4,163	4,160	4,093 - 4,233	4.162
Toluene	6,350	6.350	6.347	6.343	6.340	6,277 - 6,417	6.346
Ethylbenzene	9.640	9.643	9.633	9.630	9.627	9,563 - 9,703	9.635
m,p-Xylene	10,000	10,000	9.997	9.990	9.987	9.927 - 10.067	9.995
o-Xylene	10.983	10,987	30,980	10.973	10.973	10.910 - 11.050	10.979
Isopropylbensene	12.033	12.037	12.027	12,023	12,020	11,957 - 12,097	12.028
n-Propylbenzene	13,203	13.203	13.193	13,190	13.190	13.123 - 13.263	13.196
1, 3, 5-Trimethylbenzene	13.777	13,783	13,773	33.767	13,770	13,703 - 13,843	13.774
tert-Butylbenzene	14.627	14.630	14.620	14.613	14.613	14,550 - 14,690	14.621
1, 2, 4-Trimethylbensene	14.833	14.833	14.827	24.817	14.820	14.757 - 14.897	14.826
sec-Butylbenzene	15,327	15,323	15,317	15,310	15,313	15.247 - 15.387	15.318
4-Isopropyltoluene	15,757	15,760	15,753	15,747	15.747	15,683 - 15,823	15,753
n-Butylbenzene	16,480	16.480	16.473	16,473	16.473	16,403 - 16,543	16.476
Naphthalene	18,423	18.420	18.417	18.413	18.417	18,347 - 18,487	18:418
a, a, a-Trifluorotoluene	8.050	5,050	5.050	5.047	5.043	4.980 - 5.120	5.048
4-Ryomof norobenzene	177.463	12.467	12.460	23.453	10.463	12,340 - 12,530	12.459

GC VOA BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA CURVE EVALUATION

SDG NO.		Analy bacon No.: 202344
Instrument ID: HP5890-3 GC Column: RIX-	GC Column: RIX-VGC ID: 0.53(mm)	Heated Furge: (Y/N) N

Calibration Files:

LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level 1	STD1 480-262944/2	3 67061.□
Level 3	STD2 480-262944/3	3 67062.1
Level 3	STD3 480-262944/4	\$ 67063.D
Level 4	STD4 480-262944/5	S 67064.D
Level 5	STD5 480-26294476	3 67065.D

ANALYTE		10			CURVE		COMPTICIENT		# MIN CE	* SRSD	# MAX		# MIN B^2
	LVL L	ZVL 2	INT S	EVL 4	TABE	8	MI	MS			N X	08 000	08 000
Methyl test-butyl ether	11210	10442	9803.5	11277	AVE		10656,4633			p- 1070	20.0	0	
Benzene	31964	31844	29124	32479	AVe		32499.2067			00	20.0	0	
Toluene	36380	E 2882	271192	20177	Ave		30644.6867			11.1	20.0	0	
Sthylbenzene	30785	26740	24749	27447	Ave		27276.8867			00	20.0	0	
m,p-Xylene	35965	30254	28032	31778	Ave		31450.1883			2.5	20,0	0	
o-Xylene	29525	2 6393	1995 1995 1995 1995 1995 1995 1995 1995	27408 Ave	Ave		26884.2167			9	20.0	0	
Isopropylbenzene	22665	22289	21041	2350D Ave	Ave		22827.1533			en.	20.0	0	
n-Fropylbensene	31550	24590	22854	25505 Lini		1191.83055	24580.1913					0566 0	0066"0
1, 3, 5-Trimethylbenzene	37603	36997	34302	38517	Linl	1642.96310	37188.8195					0,9980	0.9900
tert-Butylbenzene	21460	19857	18602	20828	Ave		20156.2433			(1)	20.0	D.	
1, 2, 4-Trimethylbenzene	29257	28450	26850	30006	Ave		29298.6800			6.3	20.0	0	
sec-Butylbensene	22415	21176	1.9871	22430	Ave		21498,1333			4.9	20.0	0	
4-Isopropyltoluene	22965	20952	19830	22281	Ave		21504.1300			un	20.0	o	
n-Batylbenzene	25850	22013	20892	23572	Ave		23040,1633			v-1 00	20.0	_	
Naphthalene	15826	0FSFT	14635	16970	Lan	-982.87647	15909.8545					0.8970	0.9900

Note: The mi coefficient is the same as Ave of for an Ave curve Lype.

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GC VOA BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA CURVE EVALUATION

Lab Name: TestAmerica Buffalo Job N SDG No.:	Job No.: 480-89467-1		Analy Batch No.: 262944
Instrument ID: HP5890-3	GC Column: RIX-VGC ID: 0,53(mm)	ID: 0.53(mm)	Heated Furge: (Y/N) N

ANALYTE		EO:	las		CURVE		COEFFICIENT		MIN 6	MIN CE *RSD #	-	B.72	# MIN RYZ
	IVE 1	LVL 2	IVL 3	LVL 4	TYPE	a	W	M2				SESD OR COD	98 COD
a, a, a-Trifluorotoluene	14343	14224	11617	10794	Ave		13144.7333			13.7	20,0	0	
4-Bromofluorobenzene	34168	34046	28138	26032 Ave	Ave		31527.0111			64 67	20.0	0	

Note: The mi coefficient is the same as Ave CF for an Ave curve type,

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FORM VI GC VOA BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA RESPONSE AND CONCENTRATION

Name: T	Lab Name: TestAmerica Buffalo		Job No.: 480-89467-1		Analy Batch No.: 262944
SDG No.:					
triment	hstrument ID: HP5890-3		GC Column: RIX-VGC	ID: 0.53(mm)	Heated Furge: (Y/N) N
ibration	Calibration Start Date: 09/10/2015	17:44	Calibration End Date: 09/10/2015 19:52	09/10/2015 19:52	Calibration ID: 24885

i jone i	AND STREET OF STREET	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	
EVEL:	LAB SAMPLE ID:	LAB FILE 1DS	
evel 1	STD1 480-262944/2	S 67061.D	
Level 3	STD2 480-262944/3	3 67062.D	
evel 3	STD3 480-262944/4	3 67063.D	
evel 4	STD4 480-262944/5	3 67064.D	
Level 5	STDS 480-26294476	3 67065.0	

ANALITE	CURVE			RESPONSE				CONCE	CONCENTRATION	(ne/rr)	
	TYPE	LVL L	LAYL 2	LVL 3	LVL 4	LVL 5	LVL 1	LVL 2	LVL 3	LVL 4	LVL 5
Methyl tert-butyl ether	Ave	2242	41766	196109	338302	632918	0.200	4.00	20.0	30.0	60.09
Benzene	Ave	7417	127374	582485	974380	1917837	0.200	4.00	20.0	30,0	60.09
Toluane	Ave	7276	119291	543844	905318	1779073	0.200	4.00	20,0	30.0	0.09
Ethylbenzene	Ave	1519	106959	494986	823418	1599787	0,300	4.00	20.0	30.0	0.03
m, p-Xylene	Ave	14386	242032	1121280	1906674	3746645	0.400	8.00	40.6	0.09	120
o-Xylene	Ave	5065	105573	492824	822228	1587248	0.200	4.00	20.0	30.0	0.09
Isopropylbenzene	Ave	4 928	89136	420825	7.05005	1359921	0.200	4.00	20.0	30.0	0.09
n-Fropylbensene	Turi	6312	98338	457083	765152	1486112	0.200	4.00	20.0	30.0	0.09
1, 3, 5-Trimethylbenzene	Lin1	9463	147988	686037	1155516	2256174	0.200	4.00	20,0	30.0	60.09
tert-ButyIbenzene	Ave	4292	79427	372038	624834	1202086	0.300	4.00	20.0	30.0	60.0
1, 2, 4-Trimethylbenzene	Ave	6368	113801	537006	302882	1755407	0.200	4.00	20.0	30.0	0.09
sec-Butylbenzene	Ave	4483	84704	397414	672885	1295968	0.200	4.00	20.0	30.0	0.09
4-Isopropyltoluene	Ave	4593	83806	396600	668424	1289601	0.200	4.00	20.0	30,0	60.09
n-Burylbenzene	Ave	5170	88052	417848	707155	1372415	0.200	4.00	20.0	30.0	0.09
Naphthalene	Linl	2464	58159	292696	509108	949564	0,200	4.00	20.0	30.0	60.09
a, a, a-Trifluorotoluene	Ave	258178	256030	209105	194300	265413	18.0	18.0	18.0	18.0	18.0
4-Bromofluorobenzene	Ave	615032	612822	506488	468577	634512	18.0	18.0	18.0	13.0	18.0

Curve Type Legend:
Ave = Average
Lin1 = Linear 1/conc

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FORM VI GC VOA BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA RETENTION FINE SUMMARY

SDG No.:	1	Portion of the second of the s
Instrument ID: HP5890-3 GC Column: RIX-VGC	<-VGC ID: 0.53(num)	Heated Furge: (I/N)

LAB SAMPLE ID: LAB FILE ID: 11.K 12.6/15.5.D 12.K 13.6/15.0 14.K 14.K 15.6/15.0 15.6/15.0 16.K 15.6/15.0						
SAMPLE	LAB FILE ID:	\$ 67154.D	3 67155.D	S 67156.D	2 67157.D	8 67158.D
	SAMPLE					
	DEVEL:	Level 1	Level 2	Level 3	Level 4	Level 5

AVG RT	4.405	10.330
BIT WIMDOW	4,333 - 4,473	10,257 - 10,397
H		
LVL S	4.407	IO,343
LVI 4	4,407	10,333
LVL 3	4.403	10.327
18	4.403	10.323
LVL 1	4,403	10,323
ANALYTE	rifluorotoluene	flucrobenzene

FORM VI GC VOA BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA CURVE EVALUATION

Lab Name: TestAmerica Buffalo		Job No.: 480-89467-1		Analy Batch No.: 266158
SDG No.:				
Instrument ID: HP5890-3		GC Column: RIX-VGC ID: 0.53(mm)	ID: 0.53 (mm)	Heated Furge: (Y/N) N
Calibration Start Date: 09/29/2015	15:23	Calibration End Date: 09/29/2015 17:3	19/29/2015 17:31	Calibration ID: 25065

LAB FILE ID:	3 67154.D	3 67155.D	3 67196.D	S 67157.D	3 67158.D
SAMPLE ID:					

filuorobolusne	5 LVL 2 LVL 3 LVL 4 TYPA B MI M2		# MIN R-2 OR COD	R-2 OR COI	MAX 98SD 20.0	41.	%RSD	in to	2			M1 M1 10406.7444 25092.7333	a la	CURVE TYPE Ave	10918 26341	1ML 9 11176 26955	Gv E	LVL 1 LVL 1 LVL 5 10695 8254.1 25742	ANALYTE ifluorotolu luorobenzen
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Note: The mi coefficient is the same as Ave US for an Ave curve type,

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FORM VIGC VOA BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA RESPONSE AND CONCENTRATION

Lab Name: TestAmerica Buffalo SDG No.:	Job No.: 480-89467-1	Analy Batch No.: 266158
Instrument ID: HP589D-3	GC Column: RIX-VGC ID: 0.53(mm)	Heated Furge: (Y/N) N
Calibration Start Date: 09/29/2015 15:23	Calibration End Date: 09/29/2015 17:31	Calibration ID: 25065

	- 200	LAR SAMPLE ID: LAR FILE ID:	BLK. S 67154.D	BLK 8 67155.D	BLK 8 67156.D	BLK 3 67157.D	T 00122
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ANALYTE	CURVE			RESPONSE				CONCE	TRATION (U	G/T)	
	TYPE	EVE 1	LVL 2	LVE 3	LVL 4	LVL 5	LVL 1	LVL 2	LVL 3	LVL 4	INL 5
a, a, a-Trifluorotoluene	Ave	192505	197832	201174	196522	148574	18,0	18.0	18.0	18.0	18.0
4-Bromofluorobenzene	Ave	463354	474764	485185	474146	360897	0.80	18.0	18.0	18.0	18.0

Curve Type Legend: Ave - Average

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FORM VI GC VOA BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA RETENTION TIME SUMMARY

Lab Name: TestAmerica Buffalo SDG No.:	Job No.: 480-89467-1	Analy Batch No.: 266158
Instrument ID: HP589D-3	GC Column: RIX-VGC ID: 0.53(mm)	Heated Furge: (Y/N)
Calibration Start Date: 09/29/2015 15:23	Calibration End Date: 09/29/2015 17:31	Calibration ID:

SAMPLE ID: 1A8 FILE ID: 8-67154.D 8-67155.D 8-67156.D 8-67156.D 8-67158.D 8-67158.D						
SANFLE ID:	LAB FILE ID:	\$ 67154.D	8 67155.D	8 67156.D	S 67157.D	S 67158.D
	SAMPLE ID:					
	LEVEL:	Level 1	Level 2	Level 3	Level 4	Level 5

	200000				-			
Ā	\geq	3	LVL 3	LVI 4	12		ŏ	AVG RT
rotoluene	5.047	5.047	5.047	5,050	5,053		4.977 - 5.117	5.049
benzene	12,450	12,450	12,453	13,457	12,463		12,383 - 12,523	12.455

GC VOA BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA CURVE EVALUATION

Lab Name: TestAmerica Buffalo	170	Job No.: 480-89467-1		Analy Batch No.: 266158
SDG No.:				
Instrument ID: HP5890-3		GC Column: RIX-VGC ID: 0.53(mm)	ID: 0.53(mm)	Heated Furge: (Y/N) N
Calibration Start Date: 09/29/20	29/2015 15:23	Calibration End Date: 09/29/2015	09/29/2015 17:31	Calibration ID: 25066

The same of the sa		
LEVEL:	LAB SAMPLE ID:	LAB FILE ID:
Level I	BIK	3 67154.□
Level 2	BLK	3 67155.D
Level 3	BLK	3 67156.D
Level 4	BLK	3 67157.D
Level 5	BLK	3 67158,D

# MIN Bo2	08 000		
#	goo		
MAX R-2	o B	0	0
MAX	N N N	20.0	20.0
RSD #		64 T	11.8s
MIN CE %RSD			
(E)			
	W.		
COEFFICIENT	MI	14232,1889	34098.7333
	B		
CURVE	TYPE	Ave	Ave
	LVL 4	14916	35717 Ave
	LVL 3	19201	36485
CE	ZVE 2	15048	35883
	INT I	14576	35209
ANALYTE		a, a-Trifluorotoluene	Bromofluorobenzene

Note: The mi coefficient is the same as Ave CF for an Ave curve type,

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FORM VI GC VOA BY EXTERNAL STANDARD - INITIAL CALIBRATION DATA RESPONSE AND CONCENTRATION

Ĭ		
Analy Batch No.: 266158	N WWW. sammed based	Calibration ID: 25066
	TD: 0 52/mm)	09/29/2015 17:31
Job No.: 480-89467-1		End Date
		15:23
ffalo		09/29/2015
umerica Bu	000000000000000000000000000000000000000	ut Date:
Lab Name: TestAmerica Buffalo	SUG NO.:	Calibration Start Date: 09/29/

LAB SANFLE 1 BLK 2 BLK 4 BLK

ANALYTE	CURVE			RESPONSE				CONCER	WIRATION (U	(T/5)	
	TYPE	LVL 1	IMP 2	LVL 3	LVL 4	LVL 5	LVL 1	LVL 2	LVL 3	LVL 4	INL 5.
a, a, a-Trifluorotoluene	Ave	262362	270870	273612	268481	205572	18.0	18.0	18.0	18.0	18.0
4-Bromofluorobensene	Aye	633770	645891		642839	489588	0.80	18.0	18.0	18.0	18,0

Curve Type Legend: Ave - Avelage

FORM VII GC VOA CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Buffalo Job No.: 480-89467-1

SDG No.:

Lab Sample ID: CCV 480-273207/2 Calibration Date: 11/05/2015 07:57

Instrument ID: HP5890-3 Calib Start Date: 09/10/2015 17:44

GC Column: RTX-VGC ID: 0.53(mm) Calib End Date: 09/10/2015 19:52

Lab File ID: 3 69022.D Conc. Units: ug/L Heated Purge: (Y/N) N

ANALYTE	CURVE	AVE CF	CF	MIN CF	CALC	SPIKE AMOUNT	&D	MAX %D
Methyl tert-butyl ether	Ave	8724	7723		17.7	20.0	-11.5	15.0
Benzene	Ave	25507	22271		17.5	20.0	-12.7	15.0
Toluene	Ave	23818	21053		17.7	20.0	-11.6	15.0
Ethylbenzene	Ave	20867	18791		18.0	20.0	-9.9	15.0
m,p-Xylene	Ave	24188	21394		35.4	40.0	-11.6	15.0
o-Xylene	Ave	21132	18519		17.5	20.0	-12-4	15.0
Isopropylbenzene	Ave	18328	16187		17.7	20.0	-11.7	15.0
n Propylbenzene	Lini		17794		18.3	20.0	-8.7	15.0
1,3,5-Trimethylbenzene	Lini		26356		17.8	20.0	-10.9	15.0
tert-Butylbenzene	Ave	16019	14109		17.6	20.0	-11.9	15.0
1,2,4-Trimethylbensene	Ave	22906	19216		16.8	20.0	-16,14	15.0
sec-Butylbenzene	Ave	17748	16188		18.2	20.0	-8.8	15.0
4-Isopropyltoluene	Ave	16734	15195		18.2	20.0	-9.2	15.0
n-Butylbenzene	Ave	17021	16289		19.1	20.0	-4.3	15.0
Naphthalene	Lini		8356		13.6	20.0	32,1*	15.0

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FORM VII GC VOA CONTINUING CALIBRATION RETENTION TIME SUMMARY

Lab Name: TestAmerica Buffalo

SDG No.:

Lab Sample ID: CCV 480-273207/2

Calibration Date: 11/05/2015 07:57

Instrument ID: HP5890-3

GC Column: RTX-VGC

ID: 0.53(mm)

Calib End Date: 09/10/2015 19:52

Lab File ID: 3 69022.D

Heated Purge: (Y/N) N

Analyte	RT -	RT WINDOW		
Analyce	KI	FROM	TO	
Methyl tert-butyl ether	2.24	2,17	2.31	
Benzene	3.49	3.42	3.56	
Toluene	5.16	5.09	5.23	
Ethylbenzene	7.49	7.42	7.56	
m,p-Xylene	7.83	7.76	7.90	
o-Xylene	8.84	8.77	8.91	
Isopropylbenzene	9.69	9.62	9.76	
n-Propylbenzene	10.80	10.73	10.87	
1,3,5-Trimethylbenzene	11.41	11.34	11.48	
tert-Butylbenzene	12.20	12,13	12,27	
1,2,4-Trimethylbenzene	12.44	12.37	12.51	
sec-Butylbenzene	12.71	12.64	12.78	
4-Isopropyltoluene	13.20	13.13	13.27	
n-Butylbenzene	14.40	14.33	14.47	
Naphthalene	17,61	17.54	17.68	

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FORM VII GC VOA CONTINUING CALIBRATION DATA

Lab Name: Test	America Buffalo	Ď.	Job No.: 480-89467-1
SDG No.:			
Lab Sample ID:	CCV 490-27320	7/2	Calibration Date: 11/05/2015 07:57
Instrument ID:	HP5890-3		Calib Start Date: 09/29/2015 15:23
GC Column: RTX-	-VGC	ID: 0.53(mm)	Calib End Date: 09/29/2015 17:31
Lab File ID: 3	69022.D		Conc. Units: ug/L Heated Purge: (Y/N) N

ANALYTE	CURVE TYPE	AVE CF	CF	MIN CF	CALC AMOUNT	SPIKE AMOUNT	&D	MAX %D
a, a, a-Trifluorotoluene	Ave	10407	12426		21.5	18.0	19.4	37.0
4-Bromofluorobenzene	Ave	25093	28992		20.8	18.0	15.5	36.0

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FORM VII GC VOA CONTINUING CALIBRATION RETENTION TIME SUMMARY

Lab Name: TestAmerica Buffalo

SDG No.:

Lab Sample ID: CCV 480-273207/2

Calibration Date: 11/05/2015 07:57

Instrument ID: HP5890-3

GC Column: RTX-VGC

ID: 0.53(mm)

Calib End Date: 09/29/2015 17:31

Lab File ID: 3 69022.D

Heated Purge: (Y/N) N

haduta	DIT	RT WIN	IDOW
Analyte	RT -	FROM	TO
a,a,a-Trifluorotoluene	4.41	4,34	4.48
4-Bromofluorobenzene	10.32	10.25	10.39

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FORM VII GC VOA CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Buffalo Job No.: 480-89467-1
SDG No.:

3133 NO. .

Lab Sample ID: CCV 480-273207/2 Calibration Date: 11/05/2015 07:57

Instrument ID: HP5890-3 Calib Start Date: 09/10/2015 17:44

GC Column: RTX-VGC TD: 0.53(mm) Caltb End Date: 09/10/2015 19:52

Lab File ID: 3 69022.D Conc. Units: ug/L Heated Purge: (Y/N) N

ANALYTE	CURVE	AVE CF	CF	MIN CF	CALC AMOUNT	SPIKE AMOUNT	&D	MAX %D
Methyl tert-butyl ether	Ave	10656	10665		20.0	20.0	0.0	15.0
Benzene	Ave	32499	31612		19.5	20.0	-2.7	15.0
Toluene	Ave	30645	29196		19.L	20.0	=4.7	15.0
Ethylbenzene	Ave	27277	26861		19.7	20.0	~1.5	15.0
m,p-Xylene	Ave	31450	30437		38.7	40.0	-3.2	15.0
o-Xylene	Ave	26884	26127		19,4	20.0	-2.8	15.0
Isopropylbenzene	Ave	22827	22824		20.0	20.0	-0.0	15.0
n Propylbenzene	Lini		24712		20.1	20.0	0.3	15.0
1,3,5-Trimethylbenzene	Linl		36932		19.8	20.0	-0.9	15.0
tert-Butylbenzene	Ave	20156	20187		20.0	20.0	0.2	15.0
1,2,4-Trimethylbensene	Ave	29299	28456		19.4	20.0	-2,9	15.0
sec-Butylbenzene	Ave	21498	21668		20.2	20.0	0.8	15.0
4-Isopropyltoluene	Ave	21504	21456		20,0	20.0	-0.2	15.0
n-Butylbenzene	Ave	2,3040	22772		19.8	20.0	-1.2	15.0
Naphthalene	Lini		12259		15.5	20.0	-22.6*	15.0

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FORM VII GC VOA CONTINUING CALIBRATION RETENTION TIME SUMMARY

Lab Name: TestAmerica Buffalo

SDG No.:

Lab Sample ID: CCV 480-273207/2

Calibration Date: 11/05/2015 07:57

Instrument ID: HP5890-3

CC Column: RTX-VGC

TD: 0.53(mm)

Calib End Date: 09/10/2015 19:52

Lab File ID: 3 69022.D

Heated Purge: (Y/N) N

Analyte	RT	RT WINDOW		
Analyte	15.1	FROM	TO	
Methyl tert-butyl ether	2,72	2.65	2.79	
Benzene	4.17	4.10	4.24	
Toluene	6.35	6.28	6.42	
Ethylbenzene	9.62	9.55	9.69	
m,p-Xylene	9.98	9.91	10.05	
o-Xylene	10.97	10.90	11.04	
Isopropylbenzene	12.01	11.94	12.08	
n-Propylbenzene	13.18	13.11	13.25	
1,3,5-Trimethylbenzene	13.77	13.70	13.84	
tert-Butylbenzene	14.61	14.54	14.68	
1,2,4-Trimethylbenzene	14.82	14.75	14.89	
sec-Butylbenzene	15.30	15.23	15.37	
4-Isopropyltoluene	15.74	15.67	15.81	
n-Butylbenzene	16.47	16,40	16.54	
Naphthalene	18,41	18.34	18.48	

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FORM VII GC VOA CONTINUING CALIBRATION DATA

Lab Name: Test	America Buffalo)	Job No.: 480-89467-1
SDG No.:			
Lab Sample ID:	CCV 490-273207	1/2	Calibration Date: 11/05/2015 07:57
Instrument ID:	HP5890-3		Calib Start Date: 09/29/2015 15:23
GC Column: RTX-	-VGC	ID: 0.53 (mm)	Calib End Date: 09/29/2015 17:31
Lab File ID: 3	69022.D		Conc. Units: ug/L Heated Purge: (Y/N) N

ANALYTE	CURVE	AVE CF	CF	MIN CF	CALC AMBUNT	SPIKE AMOUNT	%D	MAX %D
a, a, a-Trifluorotoluene	Ave	14232	17912		22.7	18.0	25.9	37.0
4-Bromofluorobenzene	Ave	34099	41726		22.0	18.0	22.4	36.0

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FORM VII GC VOA CONTINUING CALIBRATION RETENTION TIME SUMMARY

Lab Name: TestAmerica Buffalo

SDG No.:

Lab Sample ID: CCV 480-273207/2

Calibration Date: 11/05/2015 07:57

Instrument ID: HP5890-3

GC Column: RTX-VGC

ID: 0.53(mm)

Calib End Date: 09/29/2015 17:31

Lab File ID: 3 69022.D

Heated Purge: (Y/N) N

And between	200	RT WINDOW		
Analyte	RT	FROM	TO	
a,a,a-Trifluorotoluene	5,06	4.99	5.13	
4-Bromofluorobenzene	12.45	12.38	12.52	

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FORM VII GC VOA CONTINUING CALIBRATION DATA

Lab Name: TestAmerica Buffalo Job No.; 480-89467-1

SDG No.:
Lab Sample ID: CCV 480-273207/12 Calibration Date: 11/05/2015 14:14

Instrument ID: HP5890-3 Calib Start Date: 09/10/2015 17:44

GC Column: RTX-VGC ID: 0.53(mm) Callb End Date: 09/10/2015 17:44

ANALYTE CURVE AVE CF MIN CF CALC SPIKE MAX TYPE AMOUNT TRUOMA 8D Methyl tert-butyl ether 8591 19.7 20.0 -1.5 15.0 Ave. 25507 22770 20.0 -10.7 15.0 Ave 17.9 Toluene 23818 21490 18.0 20.0 -9.8 15.0 Ave Ethylbenzene Ave 20867 19371 18.6 20.0 -7.2 15.0 m,p-Nylene Ave 24188 21661 36.2 40.0 -9.6 15.0 15.0 19083 20.0 -9.7 21132 18.1 o-Xylene Ave Isopropylbenzene Ave 18328 16983 20.0 15.0 20.0 18025 18.5 7.5 15.0 n Propylbenzene Lini 1,3,5-Trimethylbenzene Lini 27093 18.3 20.0 8.4 15.0 20.0 tert-Butylbenzene 14554 15.0 16019 18.2 9.1 Ave 1,2,4-Trimethylbensene 22906 19435 17.0 20.0 15.2 15.0 sec-Butylbenzene 17748 16877 19.0 20.0 -4.9 15.0 Ave 4-Isopropyltoluene Ave 16734 15504 18.5 20.0 7.4 15.0 17021 16466 20.0 15.0 n-Butylbenzene 19.3 -3.3 Ave Naphthalene Lini 9761 15.8 20.0 20.8* 15.0

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Lab Name: TestAmerica Buffalo Job No.: 480-89467-1

SDG No.:

Lab Sample ID: CCV 480-273207/12 Calibration Date: 11/05/2015 14:14

Instrument ID: HP5890-3 Calib Start Date: 09/10/2015 17:44

GC Column: RTX-VGC TD: 0.53(mm) Calib End Date: 09/10/2015 19:52

Lab File ID: 3 69032.D Heated Purge: (Y/N) N

Analyte	RT	RT WINDOW		
Analyce	RI	FROM	TO	
Methyl tert-butyl ether	2.26	2,19	2.33	
Benzene	3.51	3.44	3.58	
Toluene	5.17	5.10	5.24	
Ethylbenzene	7.51	7.44	7.58	
m,p-Xylene	7.85	7.78	7.92	
o-Xylene	8,86	8.79	8.93	
Isopropylbenzene	9.71	9.64	9.78	
n-Propylbenzene	10.82	10.75	10.89	
1,3,5-Trimethylbenzene	11.44	11.37	11.51	
tert-Butylbenzene	12,23	12,16	12.30	
1,2,4-Trimethylbenzene	12.46	12.39	12.53	
sec-Butylbenzene	12.73	12.66	12.80	
4-Isopropyltoluene	13.23	13.16	13,30	
n-Butylbenzene	14.42	14.35	14.49	
Naphthalene	17,62	17.55	17.69	

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Lab Name: TestAmerica Buffalo SDG No.:			Job No.: 480-89467-1				
Lab Sample ID: CCV	Lab Sample ID: CCV 480-273207/12 Instrument ID: HP5890-3		Calibration Date: 11/05/2015 14:14				
Instrument ID: HP5			Calib Start Date: 09/29/2015 15:23				
GC Column: RTX-VGC	ID:	0.53(mm)	Caltb End Date: 09/29/2015 17:31				
Lab File ID: 3 690	32.D		Conc. Units: ug/L Heated Purge: (Y/N) N				

ANALYTE	CURVE	AVE CF	CF	MIN CF	CALC AMOUNT	SPIKE AMOUNT	8D	MAX %D
a, a, a-Trifluorotoluene	Ave	10407	10453		18.1	18.0	0.4	37.0
4-Bromofluorobenzene	Ave	25093	24555		17.6	18.0	-2.1	36.0

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Lab Name: TestAmerica Buffalo

SDG No.:

Lab Sample ID: CCV 480-273207/12

Calibration Date: 11/05/2015 14:14

Instrument ID: HP5890-3

GC Column: RTX-VGC

TD: Q.53(mm)

Calib End Date: 09/29/2015 17:31

Lab File ID: 3 69032.D

Heated Purge: (Y/N) N

the late	nm.	RT WINDOW		
Analyte	RT	FROM	TO	
a,a,a-Trifluorotoluene	4.43	4,36	4.50	
4-Bromofluorobenzene	10.34	10.27	10.41	

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ANALYTE	CURVE	AVE CF	CF	MIN CF	CALC AMOUNT	SPIKE AMOUNT	&D.	MAX %D
Methyl tert-butyl ether	Ave	10656	10936		20.5	20.0	2.6	15.0
Benzene	Ave	32499	31497		19.4	20.0	-3.1	15.0
Toluene	Ave	30645	29051		19.0	20.0	-5.2	15.0
Ethylbenzene	Ave	27277	26770		19.6	20.0	-1.9	15.0
m, p-Xylene	Ave	31450	31113		39.6	40.0	-1.1	15.0
o-Xylene	Ave	26884	26425		19.7	20.0	-1,7	15.0
Isopropylbenzene	Ave	22827	23005		20.2	20.0	0.8	15.0
n Propylbenzene	Lini		24943		20.2	20.0	1.2	15.0
1,3,5-Trimethylbenzene	Lini		37523		20.1	20.0	0.7	15.0
tert-Butylbenzene	Ave	20156	20538		20.4	20.0	1.9	15.0
1,2,4-Trimethylbensene	Ave	29299	29217		19.9	20.0	-0,3	15.0
sec-Butylbenzene	Ave	21498	22143		20.6	20.0	3.0	15.0
4-Isopropyltoluene	Ave	21504	21778		20.3	20.0	1,3	15.0
n-Butylbenzene	Ave	23040	22831		19.8	20.0	-0.9	15.0
Naphthalene	Lini		13886		17.5	20.0	-12.4	15.0

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Lab Name: TestAmerica Buffalo

SDG No.:

Lab Sample ID: CCV 480-273207/12

Calibration Date: 11/05/2015 14:14

Instrument ID: HP5890-3

Calib Start Date: 09/10/2015 17:44

GC Column: RTX-VGC

ID: 0.53(mm)

Calib End Date: 09/10/2015 19:52

Lab File ID: 3 69032.D

Heated Purge: (Y/N) N

Analyte	RT	RT WINDOW		
Analyte	15.1	FROM	TO	
Methyl tert-butyl ether	2.74	2.67	2.81	
Benzene	4.18	4.11	4.25	
Toluene	6.36	6.29	6.43	
Ethylbenzene	9.64	9.57	9.71	
m,p-Xylene	10.01	9.94	10.08	
o-Xylene	10.99	10.92	11.06	
Isopropylbenzene	12.04	11.97	12.11	
n-Propylbenzene	13.21	13.14	13.28	
1,3,5-Trimethylbenzene	13.80	13.73	13.87	
tert-Butylbenzene	14.63	14.56	14.70	
1,2,4-Trimethylbenzene	14.85	14.78	14.92	
sec-Butylbenzene	15.33	15.26	15.40	
4-Isopropyltoluene	15.76	15.69	15.63	
n-Butylbenzene	16.48	16,41	16.55	
Naphthalene	18,42	18.35	18.49	

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Lab Name: TestAmeri	ca Buffalo	Job No.: 480-89467-1				
SDG No.:						
Lab Sample ID: CCV	480-273207/12	Calibration Date: 11/05/2015 14:14				
Instrument ID: HP38	90-3	Calib Start Date: 09/29/2015 15:23				
GC Column: RTX-VGC	ID: 0.53(mm)	Caltb End Date: 09/29/2015 17:31				
Lab File ID: 3 6903	2.D	Conc. Units; ug/L Heated Purge; (Y/N) N				

ANALYTE	CURVE	AVE CF	CF	MIN CF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
a, a, a-Trifluorotoluene	Ave	14232	14658		18.5	18.0	3.0	37.0
4-Bromofluorobenzene	Ave	34099	34832		18.4	18.0	2.2	36.0

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Lab Name: TestAmerica Buffalo

SDG No.:

Lab Sample ID: CCV 480-273207/12

Calibration Date: 11/05/2015 14:14

Instrument ID: HP5890-3

GC Column: RTX-VGC

TD: Q.53(mm)

Calib End Date: 09/29/2015 17:31

Lab File ID: 3 69032.D

Heated Purge: (Y/N) N

Analyta	D.T.	RT WINDOW		
Analyte	RT	FROM	TO	
a,a,a-Trifluorotoluene	5.08	5.01	5.15	
4-Bromofluorobenzene	12.47	12.40	12.54	

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Lab Name: TestAmerica Buffalo Job No.: 480-89467-1

SDG No.:

Lab Sample ID: CCV 480-273207/22 Calibration Date: 11/05/2015 20:16

Instrument ID: HP5890-3 Calib Start Date: 09/10/2015 17:44

GC Column: RTX-VGC ID: 0.53(mm) Calib End Date: 09/10/2015 19:52

Lab File ID: 3 69042.D Conc. Units: ug/L Heated Purge: (Y/N) N

ANALYTE	CURVE	AVE CF	CF	MIN CF	CALC AMOUNT	SPIKE AMOUNT	%D	MAX %D
Methyl tert-butyl ether	Ave	8724	8237		18.9	20.0	-5.6	15.0
Benzene	Ave	25507	22435		17,6	20.0	-12.0	15.0
Toluene	Ave	23818	21048		17.7	20.0	-11.6	15.0
Ethylbenzene	Ave	20867	19029		18.2	20.0	-8.8	15.0
m, p-Xylene	Ave	24188	21523		35.6	40.0	-11.0	15.0
o-Xylene	Ave	21132	18699		17.7	20.0	-11.5	15.0
Isopropylbenzene	Ave	18328	17462		19.1	20.0	-4.7	15.0
n Propylbenzene	Lini		17776		18.2	20.0	-8.8	15.0
1,3,5-Trimethylbenzene	Linl		27017		18.3	20.0	-8.7	15.0
tert-Butylbenzene	Ave	16019	14148		17.7	20.0	-11.7	15.0
1,2,4-Trimethylbensene	Ave	22906	18360		16,0	20.0	-19,8*	15.0
sec-Butylbenzene	Ave	17748	17134		19.3	20.0	-3.5	15.0
4-Isopropyltoluene	Ave	16734	15257		18.2	20.0	-8.8	15.0
n-Butylbenzene	Ave	17021	16286		19.1	20.0	-4.3	15.0
Naphthalene	Lini		8218		13.4	20.0	-33,2*	15.0

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Lab Name: TestAmerica Buffalo

SDG No.:

Lab Sample ID: CCV 480-273207/22

Calibration Date: 11/05/2015 20:16

Instrument ID: HP5890-3

GC Column: RTX-VGC

ID: 0.53(mm)

Calib End Date: 09/10/2015 19:52

Lab File ID: 3 69042.D

Heated Purge: (Y/N) N

Analyte	RT	RT WINDOW		
Analyte	R1	FROM	TO	
Methyl tert-butyl ether	2.26	2,19	2.33	
Benzene	3.50	3.43	3.57	
Toluene	5.17	5.10	5.24	
Ethylbenzene	7.48	7.41	7.55	
m,p-Xylene	7.83	7.76	7.90	
o-Xylene	8.84	8.77	8.91	
Isopropylbenzene	9.68	9.61	9.75	
n-Propylbenzene	10.79	10.72	10.86	
1,3,5-Trimethylbenzene	11.42	11.35	11.49	
tert-Butylbenzene	12,20	12.13	12.27	
1,2,4-Trimethylbenzene	12.44	12.37	12.51	
sec-Butylbenzene	12.71	12.64	12.78	
4-Isopropyltoluene	13.21	13.14	13,28	
n-Butylbenzene	14.40	14.33	14.47	
Naphthalene	17,61	17.54	17.68	

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Lab Name: TestAmerica Buffalo		Job No.: 480-89467-1			
SDG No.:					
Lab Sample ID: CCV 480-27	3207/22	Calibration Date: 11/05/2015 20:16			
Instrument ID: HP5890-3		Calib Start Date: 09/29/2015 15:23			
GC Column: RTX-VGC	ID: 0.53(mm)	Calib End Date: 09/29/2015 17:31			
Lab File ID: 3 69042.D		Conc. Units: ug/L Heated Purge: (Y/N) N			

ANALYTE	CURVE TYPE	AVE CF	CF	MIN CF	CALC AMOUNT	SPIKE AMOUNT	&D	MAX %D
a, a, a-Trifluorotoluene	Ave	10407	13843		23.9	18.0	33.0	37.0
4-Bromofluorobenzene	Ave	25093	32057		23.0	18.0	27.8	36.0

FORM VII 8021B

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Lab Name: TestAmerica Buffalo

SDG No.:

Lab Sample ID: CCV 480-273207/22

Calibration Date: 11/05/2015 20:16

Instrument ID: HP5890-3

GC Column: RTX-VGC

TD: Q.53(mm)

Calib End Date: 09/29/2015 17:31

Lab File ID: 3 69042.D

Heated Purge: (Y/N) N

Analyta	p.m	RT WINDOW		
Analyte	RT	FROM	TO	
a,a,a-Trifluorotoluene	4.42	4.35	4.49	
4-Bromofluorobenzene	10.31	10.24	10.38	

Form VII 8021B

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Job No.: 480-89467-1 Lab Name: TestAmerica Buffalo SDG No.: Lab Sample ID: CCV 480-273207/22 Calibration Date: 11/05/2015 20:16 Calib Start Date: 09/10/2015 17:44

Instrument ID: HP5890-3

GC Column: RTX-VGC Calib End Date: 09/10/2015 19:52 ID: 0.53 (mm) Lab File ID: 3 69042.D Conc. Units: ug/L Heated Purge: (Y/N) N

23040

Ave

Lini

ANALYTE CURVE AVE CF MIN CF CALC SPIKE MAX TYPE AMOUNT TRUOMA 8D Methyl tert-butyl ether 10656 10442 19.6 20.0 -2.0 15.0 Ave. 32499 31550 20.0 15.0 Ave 19.4 Toluene 30645 28553 18.6 20.0 -6,8 15.0 Ave Ethylbenzene Ave 27277 26622 19.5 20.0 -2.4 15.0 m,p-Nylene Ave 31450 31552 40.1 40.0 0.3 15.0 26884 26363 19.6 20.0 15.0 -1.9 o-Xylene Ave Isopropylbenzene Ave 22827 22660 19.9 20.0 20.0 24653 20.0 0.0 15.0 n Propylbenzene Lini 1,3,5-Trimethylbenzene Lini 37332 20.0 20.0 0.2 15.0 20.0 20064 15.0 tert-Butylbenzene 20156 19.9 -0.5 Ave 1,2,4-Trimethylbensene 29299 28981 19.8 20.0 -1.1 15.0 sec-Butylbenzene 21498 21867 20.3 20.0 15.0 Ave 1.7 4-Isopropyltoluene Ave 21504 21470 20.0 20.0 0.2 15.0

22636

12155

19.6

15.3

20.0

20.0

15.0

15.0

-1.8

23,3

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n-Butylbenzene

Naphthalene

Page 311 of 326

Lab Name: TestAmerica Buffalo

SDG No.:

Lab Sample ID: CCV 480-273207/22

Calibration Date: 11/05/2015 20:16

Instrument ID: HP5890-3

Calib Start Date: 09/10/2015 17:44

GC Column: RTX-VGC

ID: 0.53(mm)

Calib End Date: 09/10/2015 19:52

Lab File ID: 3 69042.D

Heated Purge: (Y/N) N

Analyte	RT	RT WIN	IDOW
Analyce	KI	FROM	TO
Methyl tert-butyl ether	2.74	2.67	2.81
Benzene	4.18	4.11	4.25
Toluene	6.35	6.28	6.42
Ethylbenzene	9.62	9.55	9.69
m,p-Xylene	9.98	9.91	10.05
o-Xylene	10.96	10.89	11.03
Isopropylbenzene	12.01	11.94	12.08
n-Propylbenzene	13.18	13.11	13.25
1,3,5-Trimethylbenzene	13.78	13.71	13.85
tert-Butylbenzene	14.60	14.53	14.67
1,2,4-Trimethylbenzene	14.83	14.76	14.90
sec-Butylbenzene	15.30	15.23	15.37
4-Isopropyltoluene	15.74	15.67	15.81
n-Butylbenzene	16,47	16,40	16.54
Naphthalene	18,41	18.34	18.48

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Lab Name: TestAmerica Buff	alo	Job No.: 480-89467-1
SDG No.:		
Lab Sample ID: CCV 480-273	207/22	Calibration Date: 11/05/2015 20:16
Instrument ID: HP5890-3		Calib Start Date: 09/29/2015 15:23
GC Column: RTX-VGC	ID: 0.53(mm)	Calib End Date: 09/29/2015 17:31
Lab File ID: 3 69042.D		Conc. Units: ug/L Heated Purge: (Y/N) N

ANALYTE	CURVE	AVE CE	CF	MIN CF	CALC AMOUNT	SPIKE AMOUNT	&D.	MAX %D
a, a, a-Trifluorotoluene	Ave	14232	19815		25.1	18.0	39.2*	37.0
4-Bromofluorobenzene	Ave	340,99	46416		24.5	18.0	36.1*	36.0

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Lab Name: TestAmerica Buffalo

SDG No.:

Lab Sample ID: CCV 480-273207/22

Calibration Date: 11/05/2015 20:16

Instrument ID: HP5890-3

GC Column: RTX-VGC

TD: Q.53(mm)

Calib End Date: 09/29/2015 17:31

Lab File ID: 3 69042.D

Heated Purge: (Y/N) N

(Ann late	nm.	RT WINDOW		
Analyte	RT -	FROM	TO	
a,a,a-Trifluorotoluene	5.07	5.00	5.14	
4-Bromofluorobenzene	12.44	12.37	12.51	

Form VII 8021B

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FORM T GC VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1		
SDG No.:			
Client Sample ID:	Lab Sample ID: MB 480-273207/3		
Matrix: Water	Lab File ID: 3_69023.D		
Analysis Method: 8021B	Date Collected:		
Sample wt/vol: 44(mL)	Date Analyzed: 11/05/2015 08:28		
Soil Aliquot Vol:	Dilution Factor: 1		
Soil Extract Vol.:	GC Column: RTX-VGC	ID: 0.53(mm)	
% Moisture:	Level: (low/med) Low		
Analysis Batch No.: 273207	Units: ug/L		

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
71-43-2	Benzene	ND		0.20	0.023
108-88-3	Toluene	ND		0.20	0.036
100-41-4	Ethylbenzene	ND		0.20	0.029
179601-23-1	m,p-Xylene	ND		0.40	0.054
95-47-6	o-Xylene	ND		0.20	0.027
1330-20-7	Xylenes, Total	ND		0.60	0.054

CAS NO.	SURROGATE	%REC	Q	LIMITS
98-08-8	a,a,a-Trifluorotoluene	128		63-145
460-00-4	4-Bromofluorobenzene	123		64-141

FORM I 8021B

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FORM T GC VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1	
SDG No.:		
Client Sample ID:	Lab Sample ID: LCS 480-273207/	4
Matrix; Water	Lab File ID: 3 69024.D	
Analysis Method: 80218	Date Collected:	
Sample wt/vol: 44(mL)	Date Analyzed: 11/05/2015 09:00	
Soil Aliquot Vol:	Dilution Factor: 1	
Soil Extract Vol.:	GC Column: RTX-VGC ID:	0.53 (mm)
% Moisture:	Level: (low/med) Low	
Analysis Batch No.: 273207	Units: ug/L	

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
71-43-2	Benzene	3.62		0.20	0.023
108-88-3	Toluene	3.52		0.20	0.036
100-41-4	Ethylbenzene	3.58		0.20	0.029
179601-23-1	m,p-Xylene	7.32		0.40	0.054
95-47-6	o-Xylene	3.53		0.20	0.027

CAS NO.	SURROGATE	%REC	Q	LIMITS
98-08-8	a,a,a-Trifluorotoluene	127		63-145
460-00-4	4-Bromofluorobenzene	119		64-141

FORM I 8021B

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FORM T GC VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Buffalo	Job No.: 480-89467-1								
SDG No.:									
Client Sample ID:	Lab Sample ID: LCSD 480	-273207/5							
Matrix: Water	Lab File ID: 3 69025.D								
Analysis Method: 8021B	Date Collected:								
Sample wt/vol: 44(mL)	Date Analyzed: 11/05/2015 09:31								
Soil Aliquot Vol:	Dilution Factor: 1								
Soil Extract Vol.:	GC Column: RTX-VGC	ID: 0.53(mm)							
% Moisture:	Level: (low/med) Low								
Analysis Batch No.: 273207	Units: ug/L								

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
71-43-2	Benzene	3.63		0.20	0.023
108-88-3	Toluene	3.49		0.20	0.036
100-41-4	Ethylbenzene	3.63		0.20	0.029
179601-23-1	m,p-Xylene	7.43		0.40	0.054
95-47-6	o-Xylene	3.56		0.20	0.027

CAS NO.	SURROGATE	%REC	Q	LIMITS
98-08-8	a,a,a-Trifluorotoluene	133		63-145
460-00-4	4-Bromofluorobenzene	125		64-141

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GC VOA ANALYSIS RUN LOG

Lab Name: TestAmerica Buffalo Job No.: 480-89467-1

SDG No.:

Instrument ID: HP5890-3 Start Date: 09/10/2015 17:44

Analysis Batch Number: 262944 End Date: 09/10/2015 20:23

LAB SAMPLE ID	CLIENT SAMPLE 1D	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
STD1 480-262944/2 IC		09/10/2015 17:44	1	3_67061_D	RTX-VGC 0.53(mm)
STD1 460-262944/2 IC		09/10/2015 17:44	1	3 67061.D	RTM-VGC 0.53(mm)
STD2 480-262944/3 IC		09/10/2015 18:16	1	3 67062 .B	RTX-VGC 0.53(mm)
STD2 460-262944/3 IC		09/10/2015 18:16	1	3 67062.D	RTM-VGC 0.53(mm)
STD3 480-262944/4 IC		09/10/2015 18:48	1	3_67063.D	RTX-VGC 0.53 (mm)
STD3 480-262944/4 IC		09/10/2015 18:48	1	3_67063.D	RTX-VGC 0.53(mm)
STD4 480-262944/5 IC		09/10/2015 19:20	1	3_67064.D	RTX-VGC 0.53 (mm)
STD4 480-262944/5 IC		09/10/2015 19:20	1	3_67064.D	RTX-VGC 0.53 (mm)
STD5 480-262944/6 IC		09/10/2015 19:52	1	3_67065.D	RTX-VGC 0.53(mm)
STD5 480-262944/6 IC		09/10/2015 19:52	1	3 67065-D	RTX-VGC 0.53 (mm)
ICV 480-262944/7		09/10/2015 20:23	1		RTM-VGC 0.53(mm)
ICV 480-262944/7		09/10/2015 20:23	1		RTX-VGC 0.53 (mm)

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GC VOA ANALYSIS RUN LOG

Lab Name: TestAmerica Buffalo Job No.: 480-89467-1

SDG No.:

Instrument ID: HP5890-3 Start Date: 09/29/2015 15:23

Analysis Batch Number: 266158 End Date: 09/29/2015 17:31

LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
BLK		09/29/2015 15:23	1	3_67154_D	RTX-VGC 0.53 (mm)
BLK		09/29/2015 15:23	1	3 67154.D	RTM-VGC 0.53(mm)
BLK		09/29/2015 15:55	1	3 67155.D	RTX-VGC 0.53(mm)
BLK		09/29/2015 15:55	1	3_67155.D	RTM-VGC 0.53(mm)
BLK		09/29/2015 16:27	1	3_67156.D	RTX-VGC 0.53 (mm)
BLK		09/29/2015 16:27	1	3_67156.D	RTX-VGC 0.53 (mm)
BLK		09/29/2015 16:59	1	3_67157.D	RTX-VGC 0.53 (mm)
BLK		09/29/2015 16:59	1	3_67157.D	RTX-VGC 0.53 (mm)
BLK		09/29/2015 17:31	1	3_67158.D	RTX-VGC 0.53(mm)
BLR		09/29/2015 17:31	1	3 67158_D	RTX-VGC 0.53 (mm)

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GC VOA ANALYSIS RUN LOG

Lab Name: TestAmerica Buffalo Job No.: 480-89467-1

SDG No.:
Instrument ID: HP5890-3 Start Date: 11/05/2015 07:57

Analysis Batch Number: 273207 End Date: 11/05/2015 20:16

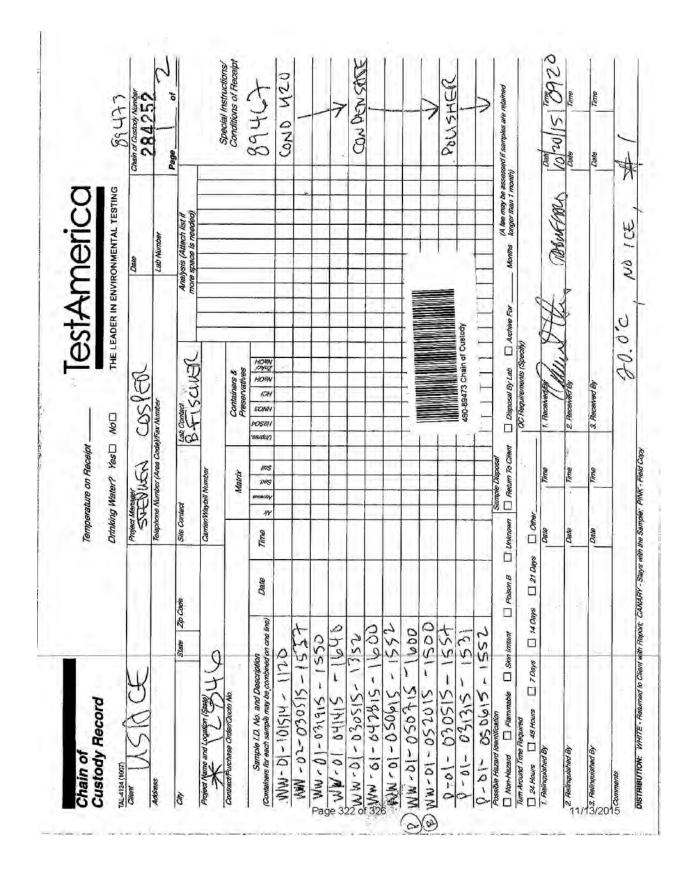
LAB SAMPLE ID	CLIENT SAMPLE ID	DATE ANALYZED	DILUTION FACTOR	LAB FILE ID	COLUMN ID
CCV 480-273207/2		11/05/2015 07:57	1	3_69022_D	RTX-VGC 0.53(mm)
CCV 480-273207/2		11/05/2015 07:57	1	3 69022.D	RTM-VGC 0.53 (mm)
MB 480-273207/3		11/05/2015 08:28	1	3 69023.B	RTX-VGC 0.53(mm)
MB 480-273207/3		11/05/2015 08:28	1	3 69023.D	RTM-VGC 0.53(mm)
LCS 480-273207/4		11/05/2015 09:00	1	3_69024.D	RTX-VGC 0.53 (mm)
LCS 480-273207/4		11/05/2015 09:00	1	3 69024.D	RTM-VGC 0.53 (mm)
LCSD 480-273207/5		11/05/2015 09:31	1	3_69025.D	RTX-VGC 0.53(mm)
LCSD 480-273207/5		11/05/2015 09:31	1	3_69025.D	RTX-VGC 0.53 (mm)
480-89467-1	WW-01-101514-1120	11/05/2015 11:33	200	3_69027.D	RTX-VGC 0.53(mm)
480-89467-1	WW-01-101514-1120	11/05/2015 11:33	200	3_69027_D	RTX-VGC 0.53 (mm)
480-89467-3	WW-01-031915-1550	11/05/2015 12:05	800	3_69028.D	RTM-VGC 0.53(mm)
480-89467-3	WW-01-031915-1550	11/05/2015 12:05	800	3 69028.D	RTX-VGC 0.53 (mm)
480-89467-4	WW-01-041415-1640	11/05/2015 12:38	200	3 69029.D	RTM-VGC 0.53(mm)
480-89467-4	WW-01-041415-1640	11/05/2015 12:38	200	3 69029.D	RTX-VGC 0.53(mm)
480-89467-7	WW-01-050615-1552	11/05/2015 13:10	200	3 69030_D	RTX-VGC 0.53(mm)
480-89467-7	WW-01-050615-1552	11/05/2015 13:10	200	3_69030.D	RTM-VGC 0.53 (mm)
CCV 480-273207/12		11/05/2015 14:14	1	3 69032.D	RTX-MGC 0.53 (mm)
CCV 480-273207/12		11/05/2015 14:14	1	3_69032.D	RTX-VGC 0.53 (mm)
480-89467-11	P-01-031315-1531	11/05/2015 15:10	2000	3_69033.D	RTX-VGC 0,53(mm)
480-89467-11	P-01-031315-1531	11/05/2015 15:10	2000	3 69033.D	RTX-VGC 0.53(mm)
480-89467-12	P-01-050615-1552	11/05/2015 16:14	400	3 69035.D	RTM-VGC 0.53 (mm)
480-89467-12	P-01-050615-1552	11/05/2015 16:14	400	3 69035.D	RTM-VGC 0.53(mm)
480-89467-21	P-01-040115-1600	11/05/2015 16:45	800	3 69036.D	RTX-VGC 0.53(mm)
480-89467-21	P-01-040115-1600	11/05/2015 16:45	800	3_69036.D	RTX-VGC 0.53(mm)
480-89467-9	WW-01-052015-1500	11/05/2015 18:41	200	3 69039.D	RTX-VGC 0.53(mm)
480-89467-9	WW-01-052015-1500	11/05/2015 18:41	200	3 69039.D	RTX-VGC 0.53 (mm)
480-89467-23	P-01-012215-0948	11/05/2015 19:13	800	3 69040.D	RTM-VGC 0.53(mm)
480-89467-23	P-01-012215-0948	11/05/2015 19:13	800	3_69040.D	RTX-VGC 0.53 (mm)
480-89467-24	WW-01-031315-1531	11/05/2015 19:44	200	3_69041.D	RTX-VGC 0.53 (mm)
480-89467-24	WW-01-031315-1531	11/05/2015 19:44	200	3 69041.D	RTX-VGC 0.53 (mm)
CCV 480-273207/22		11/05/2015 20:16	1	3 69042.D	RTX-VGC 0.53(mm)
CCV 480-273207/22		11/05/2015 20:16	1	3 69042.D	RTX-VGC 0.53(mm)

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Shipping and Receiving Documents

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TAL 4124 (1007)		Drinking W.	Drinking Water? Yes□	□ o _N	EADER IN ENVIRO	THE LEADER IN ENVIRONMENTAL TESTING	
CHEM LYSE CHEM		Project Manager	7	Project Manager COS (COS)		Date	Chain of Custody Number
Address		Telephone Nu	mber (Area Co.	e)Fax Number		Lab Number	22
State	Zp Code	Site Contect	F	B FISCUEL	Analy	Analysis (Attach list If more space is needed)	io and
Project Name and Location (State)		Carrier Waybill Number	"Number				
Contract/Purchase Orden/Quoto No.			Matrix	Containers & Preservatives			Special instructionss Conditions of Receipt
Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time 3	NOS PBS	HORN JOHUS HORN HONH FONH FOSCH			(976)
9-61-051715 -1570							POUSHER
05-01-031815-1530							SCRUBBING OIL
2001-01-01-01-10-50	0						ш
1							
1-020-10-0							>
101514 - 8							POULSMER LIQUER
77.11 - h18001-10-							
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1-09110				11			BURNOU O
2-094	3C						中国は
315-153							N.V.
Possiche Hazard Identification Non-Hazard Flammable Skiri Initant	☐ Polson B ☐	Unknown □	Sample Disposal Return To Client	☐ Disposal By Lab	Archive For	(A fee may be as Morths forger than 1 mo	(A fee may be assessed if samples are retained longer than 1 month)
Turn Arcund Time Required 24 Hours	Days 🗆 21 Days	□ Other		OC Requirements (Specify)	,		
1. Relinquished By		Date	Time	1. Received By	TAK	Charles Contracts	1/4 170 1x 17mg 20
2. Relinquished By:	-	Date	Time	2. Received By		18/100	Date
3/53 Relinquished By		Date	Time	3. Received By			Date
Comments				0	000	0 TA	111

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																									100		\$218.83							\$119.83						\$116,83		\$118,83		5119.83	
		17	\$188.75	\$168.75			\$189.75		6100 75														-	\$108.75											1								-		
	65,69	65.00			65.66					65.88									65.98		-		65.88		65.98	ш		55.68		65.80	65.88	65.99	65.68	1							65.88		65.68		65,88
3	65.09	85.83 S			55.68	-				65.69									\$ 89.59				\$5.69 \$		65.66 \$	-		65.08 \$		65.99	65.98 \$	\$ 68.89	65,99		010						\$ 65.38	-	\$ 88.89		55.69 \$
P-62-166514-1537	DS-82-186814-1535 \$	5-81-168814-1939 \$	P-01-188814-1126	9-61-19121-19-6	P-01-111314-1622 \$	P-81-812215-9948	P-81-813815-8915	P-81-838415-1545	P-81-938515-1557	P-61-831115-1528 \$	P-81-031315-1531	P-81-831815-1426	P-01-031915-1698	P-81-840115-1688	P-81-848215-1585	P-81-841415-1648	P-81-642315-1685	P-81-842415-1688	P-01-042715-1538 \$	P-61-642815-1689	P-81-858615-1552	P-81-858715-1698	P-81-958875-1598 5	P-81-051315-1530	P-81-852615-1588 S	P-81-652115-1436	05-81-182514-8916	05-81-812215-8948 \$	05-81-613015-6915	05-91-938415-1545 \$	OS-01-830515-1557 \$	05-01-031115-1520 \$	CS-61-931315-1531 \$	05-61-831815-1536	05-61-631915-1666	CS-81-648115-1686	05-81-848215-1518	05-81-841415-1649	05-81-842315-1685	05-81-842415-1688	05-01-842713-1538 \$	05-61-842815-1666	CS-81-858515-1708 S	05-81-858715-1638	05-01-052015-1500 \$
Final Polisher Lituid Sample P-62-188514-1537	Final Quencher Oil Sample OS-82-186814-1535	Initial Quencher Oil Sample 05-81-100814-1038	Initinal Polisher Liquid Sapp-01-188814-1120	Polisher Liquid Sample					Polisher Liquid Sample	Polisher Liquid Sample	Polisher Liquid Sample	1				ĺ				Polisher Liquid Sample	Polisher Liquid Sample				le el	Polisher Oil Sample				+			Ĭ				-	Quencher Oil Sample	Quencher Oil Sample	Quencher Oll Sample	Quencher Oil Sample C				Quencher Oil Sample
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Range Organics by 6C - 8815B																											200	90.00		\$ 65.99		\$ 65.08													\$ 65.99				
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Sample Type	Ash Sample	Ash Sample	Ash Sample	Ash Sample	Ash Sample	Ash Sample	NGASh Sample	Ash Segile	Ash Sample	Ash Sample	Ash Sample	Ash Sample	Ash Sample	MiAsh Sample	Ash Sapple	Ash Sample	Ash Sapple	Ash Sample	Ash Sample	Ash Sample	Ash Sample	Ash Sample	Ash Sarple	ASD SARDIE	ASh Sample 1	Condensate Court	Condendate Conde	Millondonate Cample	Condensate Sarole	Condensate Sample	Condensate Sample	Condensate Sample	Condensate Sample	Condensate Sample	Condensate Sample	Condensate Samile	Condensate Sample	Condensate Samile	Condensate Sample	Condensate Sample	Condensate Sample	Condensate Sample	Condensate Sample	Condensate Sample	Concensate Sample 1	Condensate Sample 1	Condensate Sample 2	Condensate Sample 2	Collectione Salpte >
Feedstock	13/Nov/2014 SERDP Long Term Mix	22/Jan/2015 SERDP Long Term Mix	29/Jan/2015 SERDP Long Jerm Mix	SØ/Jan/2015 SERDP LONG Term Mix	SERDP LONG Term Nix	19/Feb/2015 SERDP Long Term Mix	SERDP 188% Construction Midsh Sample	BERDP 58% Plastics Mix	11/Mar/2015 SERDP 50% Food Mix	SERUP 33% POL MIX	18/Mar/2015 SERDP 40% Tires Mix	SERDP Long Term Max	SERDP LONG Term Mix	SEROP 199% Construction MiAsh Sample	SERDE 48% Tires Mix	25/4pr/2015 SERDP 50% Food Mfx	24/4pr/2015 SERDP 33% POL MEX	27/Apr/2015 SERDP Long Term Mix	28/Apr/2015 SERDP LONG Term Mix	7/May/2615 SERDP Long Term Mix	SERDP Long Term Mix	SERDP LONG Term Mix	28/May/2015 SERDP Long Term Max	SACRETARY SELD SEXUL LONG TERM MIX	SERVICE LONG LEVEL MEX	15/Oct/2014 Stand Long Larm Max	36/3an/2015 SEADP Long Jarm Mix	SEROP 188% Construction MiCondensate Cample	13/Mar/2015 SERDP 33% POL NEX	18/Mnr/2015 SERDP 40% Tires Mix	SERDP Long Term Mix	SERDP Long Term Mix	SERDP 100% Construction M Condensate Sample	29 April 2015 SERDP 46% Tires Max	24/Apr/2015 SERDP 28% POI MEY	SERDP LONG Term Mix	SERDP LONE TENE MIX	SERDP LONG TEPM MAX	SERDP Long Term Mix	SERDP Long Term Mix	SERDP Long Term Mix	SEKDP LONG Term Mix	SERDP Long Term Mix	SERDP SEE FOOD MAX	SERDP LONg Terre MLX	CERTO LANGE TOWN MAY	SERDP Set Plastics Mix	SERDP LONG Tend Mix	BOD Love Town Bear
Date	13/Nov/2614	22/Jen/2015	29/Jan/2015 K	30/Jan/2015 5	4/Feb/2015 S	19/Feb/2815 [8		5/Mar/2825 B	11/Nar/2015 5	13/Nar/2015 5	18/Mar/2015 B	5.0	1/Apr/2015 S	2/Apr/2815 S	14/Apr/2815 S	23/4pr/2015 19	24/4pr/2815 S	27/Apr/2615 5	28/Apr/2015 5	7/May/2615 S	8/hay/2015 S	13/Nay/2015 5	28/May/2815 S	5 CTD1/5012 S		15/Dc+/2014 C	30/Jan/2015 S	6/Nar/2015 S	13/Mar/2015 S	18/Mar/2015 S			2/Apr/2815 S	24/Apr/2015 S	4/Apr/2015 S	27/405/3815 \$				8/May/2815 SE			21/May/2815 S		8/0ct/2014 St		-		
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Login Sample Receipt Checklist

Client: U.S. Army Construction Engineering Resea

Login Number: 89467 List Source: TestAmerica Buffalo

Job Number: 480-89467-1

List Number: 1

Creator: Kinecki, Kenneth P

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	
Cooler Temperature is acceptable	False	
Cooler Temperature is recorded.	True	
COC is present	True	Filled out by TA Buffalo personnel
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information	True	
Is the Field Sampler's name present on COC?	False	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	False	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	False	Canning Jars
Sample bottles are completely filled.	False	
Sample Preservation Verified	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	True	All containers have headspace
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present	True	
Samples do not require splitting or compositing.	True	
Sampling Company provided.	True	USACE
Samples received within 48 hours of sampling.	True	
Samples requiring field filtration have been filtered in the field.	N/A	
Chlorine Residual checked.	N/A	

TestAmerica Buffalo Page 326 of 326 11/13/2015

Appendix H: Diesel Engine Disassembly and Inspection Report



Rotary Kiln Gasification of Solid Waste for Base Camps SERDP Project Number WP-2211

Diesel Engine Disassembly and Inspection Report

July 2015









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Summary of Engine Clock Hours	
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Engine Removal, Disassembly, Rebuild, and Re-Install	6
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Appendix E - Engine Measurement Specifications and Procedures	45
Annendix F - Replacement Parts and Receipt	61

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Executive Summary

A 60 kW electrical power generator was used for all test runs and was driven by a John Deere 5030HF270 diesel engine. This engine was disassembled at the conclusion of testing, inspected, cleaned, and reassembled to factory rebuilt condition in July 2015. The engine had 480.8 hours on the engine run clock at the time of disassembly. The majority of this time (470.8 hours) was run dual fueled on waste derived synthetic gas.

The engine was in surprisingly good condition. The engine performance was tested prior to disassembly and was found to produce full rated power. Each cylinder was within the rated compression pressure specification and the critical internal engine components were found to be within factory specifications. A sample of the crankcase oil was analyzed and was found to be within normal tolerances (see appendix D).

Significant observations include the following:

- 1. Carbon build up was observed on the intake valve stems (attributed to excessive cooling of syngas by cold intake air during winter operations).
- 2. Slight wear was observed on the valve guides (attributed to carbon build-up).
- 3. Slight pitting on exhaust valves (attributed to high moisture content in syngas fuel).
- 4. Slight impression on cylinder #1 piston (attributed to foreign object passing through engine).
- 5. Scouring on cylinder #5 piston (attributed to overheating during early trials).
- 6. Metal shavings were found in the crankcase oil pan directly under the turbo charger oil drain (attributed to aspirating syngas through the turbo charger compressor).

Summary of Engine Clock Hours

- Hours 0 to 10 Initial break in and load center debug.
- Hours 10 to 248.6 hours DoD III system development and run testing dual fueled on syngas. Engine overheated and stopped during this testing. Not part of SERDP, but engine was operated on syngas for these clock hours prior to the disassembly inspection at 480.8 hours.
- Hours 248.6 to 480.8 hours SERDP run testing on the composite mixes Total operating hours for SERDP mixes dual fueled on syngas 232.2 hours.
- Hour = 480.8 hours Engine was removed from generator housing, disassembled, inspected, and reassembled. Engine was rebuilt to new condition.
- Hours 480.8 to 485 hours Engine operated on 100% diesel fuel debug and break in.
- Hours 485 to 496.3 hours Engine operated an additional 11.3 hours on syngas using SERDP standard mix.

Total hours operating on SERDP mixes = 243.5 hours.

Total hours operating dual fueled on waste derived syngas prior to disassembly = 470.8 hours.

Total hours operating dual fueled on waste derived syngas = 482.1 hours.

Introduction:

All SERDP run testing was conducted using a 60 kW diesel engine driven generator that was packaged by Central Maine Diesel. The generator is equipped with a John Deere 5030HF270 diesel engine rated for generator drive service. The engine has a prime crankshaft power rating of 87 brake horsepower, providing enough power to generate a maximum of 53 kW.

The engine is equipped with a precision mechanical governor that maintains the crankshaft speed at a constant synchronous speed of 1800 rpm. The engine also has an auxiliary power take off that is located on the right hand side of the engine. This power take off was used to drive a hydraulic gear pump rated for a constant displacement of 21.9 gallon per minute at 1500 psig (22.7 BHP at 85% efficiency). This pump provides the power to operate the gasification system components, including the hydraulically driven reactor rotary drive, main aspiration blower, and polisher pump.

The entire gasification system is controlled by a 24 VDC automation system. Power to operate this system is provided by the battery charging system and the engine alternator. The total power to drive the alternator and radiator cooling fan was 5.8 BHP. The total loss of crankshaft power is 28.5 BHP, which includes the hydraulic gear pump operating by the power take-off. The maximum amount of electrical power the generator can provide is 40.4 kW at 100% prime rated crankshaft power. Sustained operation at this level was not possible and the engine consistently overheated due to overloading. Lugging at this load also occurred when operating on low quality winter mix fuel (low heating value) during winter months.

SERDP hot tests were conducted at various electrical loads between 20 kW (67% of maximum prime rated crankshaft power) and 30 kW (84% of maximum prime rated crankshaft power). The majority of tests were conducted at 25 kW, which loaded the engine at 75% of maximum rated crankshaft power and provided reliable operation. The stated electrical loads are net available usable power that was consumed by a 3 phase 480 VAC load bank.

One significant problem observed during testing was the engine was too small for the gasifier. An engine with at least 50% more horsepower could have been used to achieve the full 60 kW usable electrical power output. The gas flow from the gasifier had to be reduced to match the fueling needs of the generator. 60 kW Tactical Quiet Generating Sets have an engine power rating of at least 135 BHP (55% power increase over engine tested) to allow full power output under all operating conditions (such as high elevation and 50 Hz).

SERDP hot testing on the waste mixes continued throughout the winter, spring, and early summer of 2015. The intent was to maximize the engine run time prior to the loss of funding. The engine was subjected to brutal weather conditions. A significant amount of testing was conducted in the winter, where ambient temperatures varied between -15 and 20 degrees F, with high winds (25 MPH) and blowing snow. Testing also occurred during the summer months, where the ambient temperatures were in excess of 90 degrees F. Operations were conducted in every foreseeable weather condition, including downpours, electrical storms, high winds, ice,

and snow storms.

The engine was removed from the generator housing and was disassembled in July 2015. SUNY Cobleskill's Agricultural Engineering Department, at Curtis Mott Hall has completed the disassembly, inspection, and rebuild of this engine at their facility. A total of 480.8 hours of performance testing was accumulated on the engine. During run time, the engine was fueled with both low sulfur diesel and a synthetic gas (syngas) produced by gasification of various base camp waste mixes.

On average, the engine was operated between 50% and 65% gaseous fueling rate, with the balance provided by liquid low sulfur diesel fuel (as determined on a low heating value basis). The engine operated normal, reliably, and provided full power at less than 65% gaseous fueling rate. The engine was operated for short terms at 79% gaseous fueling rate (79% reduction in liquid fuel consumption), but required intensive monitoring and supervision. High engine knock was also observed.

Increasing the gaseous fueling rate into the engine increases the crankshaft speed. The engine speed control governor reduces the rate of liquid fuel injection to maintain the synchronous speed of 1800 RPM. The energy value of the syngas fuel can vary as the raw feedstock tumbles within the reactor. Researchers feel sustained operation above 65% gaseous fueling rate is not reliable due to the significant risk of a crash stop if the engine speed governor completely stops the liquid fuel injection rate in the event the syngas heating value suddenly increases.

The engine was also intentionally subjected to an exceptionally high amount of moisture within the syngas. Researchers determined a method to reduce or eliminate the production condensate water by raising the syngas temperature and allowing full evaporation into the syngas stream. Saturated syngas was re-heated to about 20 degrees higher than the saturation temperature. Tests conducted after March 15th, 2015 focused on testing this method of condensate water disposal. The water evaporates into the syngas stream and combusts as superheated steam within the engine. No significant change in engine performance was observed, other than an increase in visible diesel particulate matter in the exhaust due to oxygen deprivation. The only adverse indication within the engine due to this moisture was slight pitting was observed on the seat contact area of exhaust valve.

The syngas was mixed with the aspiration air upstream of the turbo charger compressor. This configuration forced a mixture of syngas and air to pass through the turbo compressor, pass through the charge air cooler, and then to the intake manifold. No carbon or tar build-up was observed in the syngas piping upstream of the mix point, but a build-up was observed at the mix point and all points downstream. The build-up occurred only on cool surfaces (no accumulation on the turbo compressor blades) and was not a problem during operations. The main problem was the build-up restricted turbo rotation and required daily cleaning. Mechanical damage to the turbo occurred during cleaning, which resulted in noticeable metal debris accumulating in the oil pan directly under the turbo oil drain. This configuration would never be used again due to these problems. The syngas pressure would be boosted separately and fed directly into the intake manifold downstream of the turbo charger and charge air cooler.

Engine Removal, Disassembly, Rebuild, and Re-Install

The engine was removed on July 16^{th} , 2015. Disassembly commenced shortly after. Any abnormal wear and deposits found during disassembly will be noted along with all applicable component measurements and photos. The engine was assembled and installed back into the GENSET on August 3^{rd} , 2015.

Photo Documentation – Engine Removal from GENSET





Engine Removal from GENSET Continued..





 $Photo\ Documentation-Reassembly\ of\ Engine\ to\ GENSET\ August\ 3^{rd},\ 2015$



Reassembly of Engine to GENSET Continued.

7







Engine Data:

Make: John Deere Model: 5030HF270

Serial No.: **PE5030H191337**Displacement: **3.05 Liters**

No. of Cylinders: 5
No. of Valves: 10

Fuel Rate (prime rating):

Engine % Load	Crankshaft Brake Horsepower	Fuel Consumption lb/hr	Fuel Consumption gal/hr
25%	21.8	7.9	1.11
50%	43.5	15.9	2.24
75%	65.3	23.8	3.35
100%	87	31.7	4.46

Work Summary:

- 1. Engine received and information was documented
- 2. Engine oil sample was taken for Oil Scan analysis
- 3. Compression test completed on 5 of 5 cylinders (dry)
 - a. Wet compression test was not required since compression was within allowance.
- 4. External component removal
 - a. Fuel pump and filter
 - b. Alternator
 - c. Muffler
 - d. Turbocharger
 - e. Starting system
- 5. Valve cover removal
- 6. Injector removal
- 7. Valve lash verification
- 8. Head removal
- 9. Valve train removal
 - a. Valve train component inspection
- 10. Oil Pan Removal

- 11. Piston and connecting rod removal
 - a. Piston inspection
 - b. Connecting rod wear evaluation
- 12. Cylinder wear evaluation
- 13. Crank removal
 - a. Crank wear evaluation
 - b. Crankshaft main and connecting rod running clearance
- 14. Cam removal
 - a. Cam wear evaluation

Appendix A- Compression Test Results

Cylinder Compression Test

Specification
Engine Compression Pressure: 345 - 405 PSI
Maximum Difference Between Cylinders: 50 PSI

Cylinder	Compression (PSI)
1	375
2	380
3	385
4	395
5	385

Remarks:

The tested compression of each cylinder was within specified range. A wet compression test using oil was not necessary.

A-1 Compression Testing Equipment

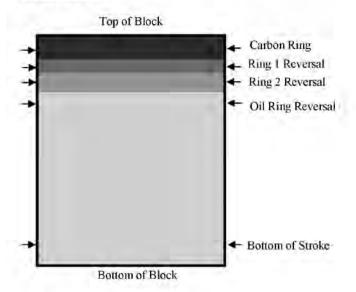


A-2 Compression Test on Cylinder 1



Appendix B: Engine Specifications and Disassembly Measurements:

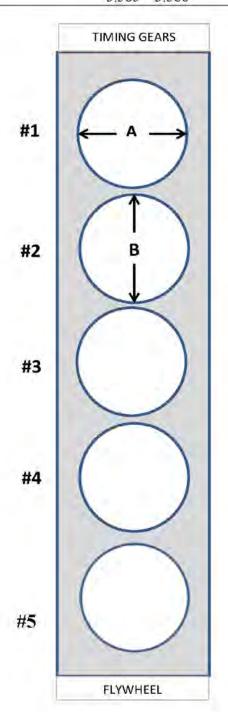
Cylinder Bore



Cylinder Bore

Specification

Standard Bore Inside Diameter (Inches): 3.385 - 3.386



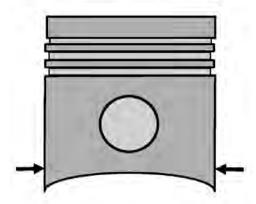
		A	В
	Position:	(Inches)	(Inches)
	CR	3.3850	3.3860
e	R1	3.3860	3.3865
Cylinder	R2	3.3860	3.3865
S	OR	3.3860	3.3865
= =	BCD	3.3860	3.3865
1. 2	CR	3.3860	3,3860
er 2	R1	3.3860	3.3865
ylinder	R2	3.3865	3.3865
3	OR	3.3865	3.3865
	BCD	3.3865	3.3865
-121	CR	3.3860	3.3860
ylinder 3	R1	3.3865	3.3865
ind	R2	3.3865	3.3865
Cyli	OR	3.3865	3.3865
	BCD	3.3870	3.3870
_	CR	3.3860	3.3865
er	R1	3.3865	3.3865
ind	R2	3.3865	3.3865
Cylinder 4	OR	3.3865	3.3865
	BCD	3.3865	3.3870
	CR	3,3860	3.3860
25	R1	3.3865	3.3870
linder 5	R2	3.3865	3.3870
,yli	OR	3.3865	3.3870
0	BCD	3,3865	3.3875

Piston Skirt Diameter

Specification	
Piston O.D.	Wear Limit (Inches):
3.3	381 - 3.382

Position	Diameter (Inches)	
Cylinder 1	3.382	
Cylinder 2	3,382	
Cylinder 3	3.382	
Cylinder 4	3,382	
Cylinder 5	3.382	

The piston skirt diameter was taken 0.5 inches from the bottom of the piston.



Piston Skirt Running Clearance

Piston skirt running clearances are calculated by the following equation:

(Ring 1 Inside Diameter) – (Piston Skirt Outside Diameter) = Piston Skirt Running Clearance

Position	Running Clearance (Inches)	
Cylinder 1	0.0040	
Cylinder 2	0.0040	
Cylinder 3	0.0045	
Cylinder 4	0.0045	
Cylinder 5	0.0045	

Specification Piston Skirt Running Clearance (Inches):	

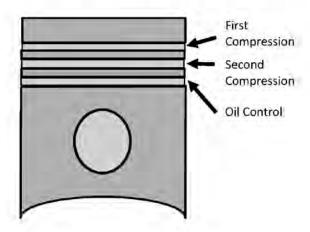
Remarks:

The piston O.D. wear limit and running clearance were within specification. Recorded piston skirt measurement for cylinder 5 was not taken over the scoring marks, but over an average wear portion of the skirt. A measurement of the diameter of cylinder 5 piston was taken over the damaged area right under the oil ring. The resulted diameter was 3.375 inches, about 7 thousandths smaller than the specified wear limit.

Ring Side Clearance

Specification or Ring-to-Groove Clearance

First Ring: Ring-to-Groove Clearance - 0.005 Inches Second Ring: Ring-to-Groove Clearance - 0.004 Inches Oil Ring: Ring-to-Groove Clearance - 0.004 Inches



Cylinder	ylinder Ring Position Side Clear (Inches	
	Top Compression	> .004 ; < .005
1	Second Compression	~ .002
	Oil Control	~ .002
	Top Compression	> .004 ; < .005
2	Second Compression	~ .002
	Oil Control	~ .0025
=,=,	Top Compression	> .004 ; < .005
3	Second Compression	~ .002
	Oil Control	~ .0025
	Top Compression	> .004 ; < .005
4	Second Compression	~ .002
	Oil Control	~ .0025
	Top Compression	> .004 ; < .005
5	Second Compression	~ .002
	Oil Control	~ .003

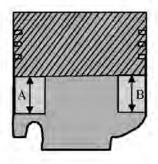
Remarks:

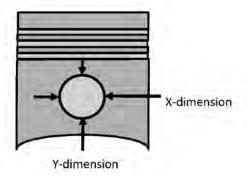
The ring side clearance for the first, second, and oil ring were all slightly under specification. This may be from carbon build up. The rings were free in the groove and gave good compression.

Piston Pin Bore, Inside Diameter

Specification	
Wear Limit:	1.1812 - 1.1815 Inches

Pin Bore from	A (Inches)		B (Inches)	
Cylinder#	X	Y	X	Y
1	1.1800	1.1800	1.1800	1.1800
2	1,1815	1,1815	1.1815	1.1815
3	1,1820	1.1820	1.1815	1.1820
4	1,1820	1,1820	1,1820	1.1820
5	1.1830	1.1825	1.1825	1.1825

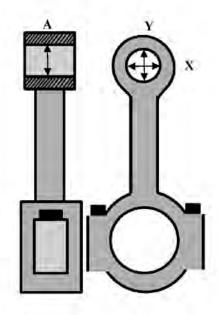




Connecting Rod Piston Pin Bearing Bore

Specification			
Wear Limit:	Wear Limit: 1.1812 - 1.1815 Inches		

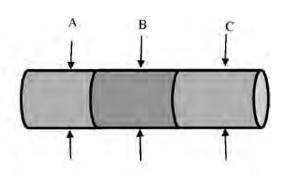
Connecting Rod from	A (Inches)	
Cylinder#	X	Y
11	1.1820	1.1820
2	1.1820	1,1820
3	1.1820	1.1815
4	1.1820	1,1825
5	1.1820	1.1820



Piston Pin

S	pecification	
Wear Limit:	1.1809 - 1.1811	Inches

Pin From Cylinder#	A (Inches)	B (Inches)	C (Inches)
1	1.1815	1.1810	1.1815
2	1.1815	1.1810	1.1815
3	1.1815	1.1810	1.1815
4	1.1810	1.1810	1.1810
5	1.1815	1.1810	1.1815



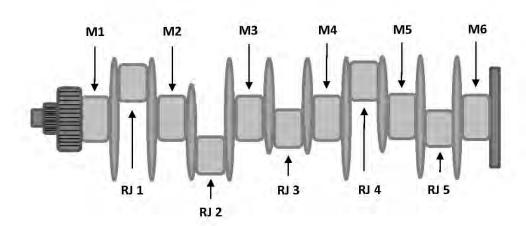
Crankshaft Main Journal Outside Diameter

Specification		
Journal Outside Diameter:	2.9522 - 2.9533	Inches

Position	X (Inches)	Y (Inches)
M1	2.953	2.953
M2	2.953	2.953
M3	2.953	2.953
M4	2.953	2.953
M5	2.953	2.953
M6	2.953	2.953

Remarks:

There was no measureable wear on the crankshaft. Minor scratches were observed on the journal surface, but this wear is typical for an engine with 480 hours.



Journal Crankshaft Connecting Rod Outside Diameter

Specification		
Connecting Rod Journal Outside Diameter:	2.36170 - 2.36270	Inches

Position	X	Y
Cylinder 1	2,3655	2.3655
Cylinder 2	2.3630	2.3630
Cylinder 3	2.3625	2.3625
Cylinder 4	2.3630	2.3630
Cylinder 5	2.3625	2.3625

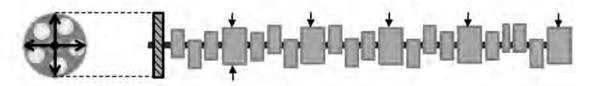
Remarks:

There was a slight difference in size between rods. Minimal wear and scratches were observed on the main journals. Minor polishing was required for rebuild.

Cam Shaft Journal Outside Diameters

Specification		
Cam Shaft Journal O.D.:	2.3617 - 2.3627	Inches

Journal	Position	X	Y
J1	A	2.3625	2.3625
J2	A	2,3625	2.3625
J3	A	2.3625	2.3625
J4	A	2.3625	2.3625
J5	A	2.3625	2.3625



Cam Bearing and Parent Bores

Specification		
Cam Bearing and Parent Bores Clearance:	2.3642 - 2.3672	Inches

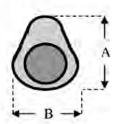
Bearing and Bores	X	Y
31	2,3650	2,3650
J2	2.3640	2.3640
J3	2.3650	2.3650
J4	2.3650	2.3650
J5	2.3650	2.3645

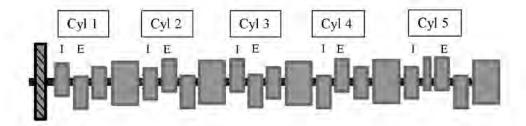
Remarks:

Minimal wear, cam shaft journals did not have abnormal wear for the hours. All measurements were within specification.

Cam Lobes

Specifications	
Cam Lobe Height:	0.278 - 0.288 Inches





Journal	Position	A	В	Lobe Height (A-B)
Cyl 1	I	2.0480	1.811	0.2370
Cyrr	Е	2.0500	1.811	0.2390
C-12	I	2.0495	1.811	0.2385
Cyl 2	Е	2.0500	1.809	0.2410
Cyl 3	I	2.0475	1.808	0.2395
	Е	2.0490	1.809	0.2400
C-1.4	I	2.0465	1.808	0.2385
Cyl 4	Е	2.0480	1.808	0.2400
C-15	I	2.0420	1.804	0.2380
Cyl 5	Е	2.0460	1.803	0.2430

Remarks:

The cam lobes did not look worn, but did not meet specifications. The measurement specifications provided may not be valid. No abnormal wear was observed on cams lobes. The lobes may have been undersized from the factory.

Cam Follower Stem O.D.

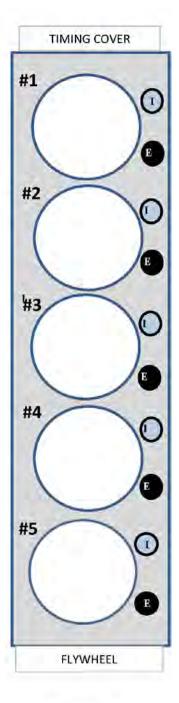
Specification:			
Wear limit: 0.8422 - 0.8427	Inches		

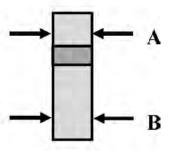
Cylinder	Valve Type	Position on Stem	Diameter (Inches)
	Total to	A	0.842
1	Intake	В	0.842
2	Davids	A	0.842
2	Intake	В	0.842
	100	A	0.842
3	Intake	В	0.842
Air .	Total to	Α	0.842
4	Intake	В	0.842
è	Donley	A	0.842
3	Intake	В	0.842

Cylinder	Valve Type	Position on Stem	Diameter (Inches)
1	Exhaust	A	0.842
1	Exhaust	В	0.842
2	Exhaust	A	0.842
2	Exhaust	В	0.842
3	Exhaust	A	0.842
3	Exhaust	В	0.842
, A	Exhaust	A	0.842
4		В	0.842
5	Exhaust	A	0.842
3	Exhaust	В	0.842

Remarks:

There were some visible scruff marks and minor wear marks on the cam surface, but no measureable wear.





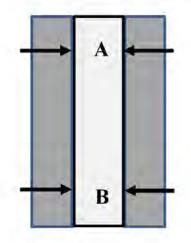
Valve Guide Measurements

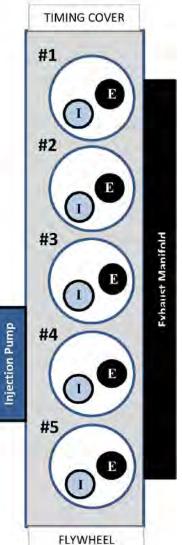
Specifications

Measurements were taken at A (initial) and B (final). The difference between these two points should be zero in its new state. To calculate the difference, subtract the initial from the final measurement (B-A).

Cylinder	Valve Type	Difference (Inches)
1	Intake	0.0025
2	Intake	0.0015
3	Intake	0.0025
4	Intake	0.0020
5	Intake	0.0010

Cylinder	Valve Type	Difference (Inches)
1	Exhaust	0.0015
2	Exhaust	0.0025
3	Exhaust	0.0010
4	Exhaust	0.0010
5	Exhaust	0.0020





Remarks:

There was a taper found on all the valve guides. This may be from carbon build up on valve stems that coated the inside on the valve guides. Wear may have occurred from the carbon build up on the intake valves. Metal inside the valve guide is missing in the B area.

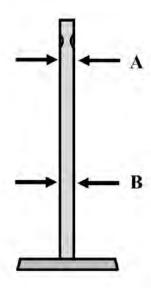
Valve Stem Diameter

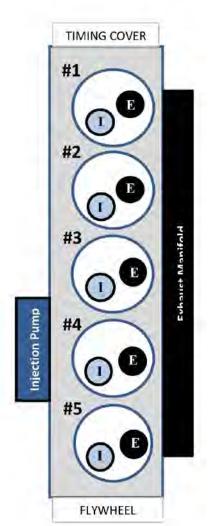
Specification		
Intake Valve Stem O.D.: 0.2751 - 0.2761 Inches	Ī	
Exhaust Valve Stem O.D.: 0.2746 - 0.2755 Inches		

Cylinder	Valve Type	Position of Guide	Measurement (Inches)
- 1	Intake	A	0.2755
1	шаке	В	0.2755
2	Totales	A	0.2755
2	Intake	В	0.2755
	Intake	A	0.2755
3	шаке	В	0.2755
4	Intake	Α	0.2755
4		В	0.2755
	Total	A	0.2755
2	Intake	В	0.2755

Cylinder	Valve Type	Position of Guide	Measurement (Inches)
1	e t	A	0.2745
1	Exhaust	В	0.2745
2	Exhaust	A	0.2750
2		В	0.2755
3	Exhaust	A	0.2752
3	Exhaust	В	0.2753
4	Exhaust	A	0.2752
4		В	0.2754
	Pollowing	A	0.2751
3	Exhaust	В	0.2752

Remarks: Within specifications.

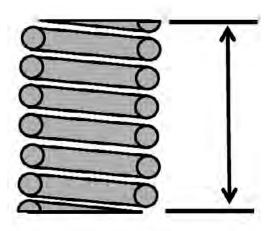




Spring Free Length

Specification	n	
Minimum Free Length:	1.818	Inches

Cylinder	Valve	Length (Inches)
1	1	1.842
1	E	1.830
2	Ĩ	1.830
2	Ti.	1.831
3	I	1.813
3	E	1.832
4	_ I	1.823
	E	1.831
5	1	1.830
2	E	1.834



Spring Compressed Length

Specif	fication
Spring Compressed Length	1.4 Inches (a) 56 lbs of Force

Cylinder	Valve	Force (lbs) at 14 In.
1	I	56
	E	56
2	I	57
	E	56
3	I	54
	E	56
4	I	56
	E	57
5	1	55
	E	56

Remarks: Cylinder 3 intake spring force was slightly weak. The free length was under minimum and was under the 56 lbs of rated force at 1.4 inches.

Valve Seat Width

Specification		
Intake Seat Width: 0	.077 Inches	
Exhaust Seat Width:		

Cylinder	Intake	Exhaust
1	0.079	0.088
2	0.088	0.099
3	0.087	0.078
4	0.085	0.084
5	0.089	0.082

Remarks: Acceptable.

Appendix C: Photo Documentation

C-1 John Deere Serial Plate Number



C-2 Combustion System



C-3 Cylinder 2 – Representative of Cylinders 1, 2, 3, & 4



C-4 Scoring Seen on Cylinder 5 Wall (overheating during initial trials)



C-5 Discoloring Found on Cylinder 2 Piston Skirt – Representative of Pistons 1, 2, 3, & 4 (indication of overheating)



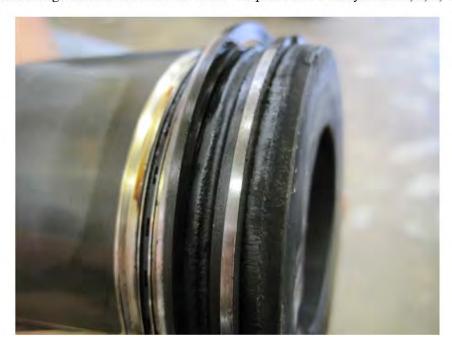
C-6 Scoring Found on Cylinder 5 Piston Skirt (indication of overheating due to overloading)



C-7 Cylinder 5 Piston Skirt (indication of overheating due to overloading)



C-8 Piston Rings are Free with Normal Wear – Representative of Cylinders 1, 2, 3, 4, & 5



C-9 Cylinder 3 Piston Head – Representative of Pistons 3, 4, & 5



C-10 Cylinder 2 Piston Head – Minor Ding (foreign material passed through engine)



C-11 Cylinder 1 Piston Head



C-12 Cylinder 1 Piston Head (foreign material such as nut or washer passed through engine)



C-13 Piston Rod Bearing – Representative of Cylinders 1, 2, 3, 4, & 5



C-14 Mechanical Engine Speed Governor Fly Weights and Cam Shaft Gear



C-15 Crankshaft



C-16 Lower Main Bearing 5 – Representative of Lower Main Bearings 1, 2, 3, 4, 5, & 6



C-17 Upper Main Bearing 6 – Representative of Upper Main Bearings 1, 2, 3, 4, 5, & 6



C-18 Upper Main Bearings



C-19 Crankshaft Journals



 $\textbf{C-20} \quad \text{Rod Journal 1} - \text{Representative of Rod Journals 1, 2, 3, 4, \& 5}$



C-21 Cam Shaft Journals



C-22 Cylinder 1 Intake, Exhaust, & Injector Lobes; Cam Journal 1 Representative of Cylinders 1, 2, 3, 4, & 5



C-23 Cam Follower Stem – Representative of Cylinders 1, 2, 3, 4, & 5



C-24 Injector Nozzle – Representative of Cylinders 1, 2, 3, 4, & 5



C-25 Engine Head



C-26 Engine Head Underside



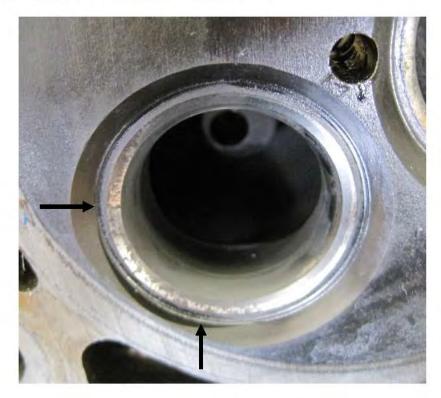
C-27 Carbon Build Up on Intake Valve Housing; Cylinder 1 Representative of Cylinders 1, 2, 3, 4, & 5



C-28 Carbon Build Up on Intake Valve; Cylinder 1- Representative of Cylinders 1, 2, 3, 4, & 5



C-29 Cylinder 5 Exhaust Valve Seat – Pitting Found on Lower Left Surface Representative of Exhaust Valves 1, 2, 3, 4, & 5



C-30 Cylinder 5 Exhaust and Intake Valve Seats



C-31 Exhaust Valve – Representative of Cylinders 1, 2, 3, 4, & 5



C-32 Exhaust Valve and Stem – Representative of Cylinders 1, 2, 3, 4, & 5



C-33 Turbo Charger



C-34 Turbo Charger Intake



45

C-35 Oil Pan



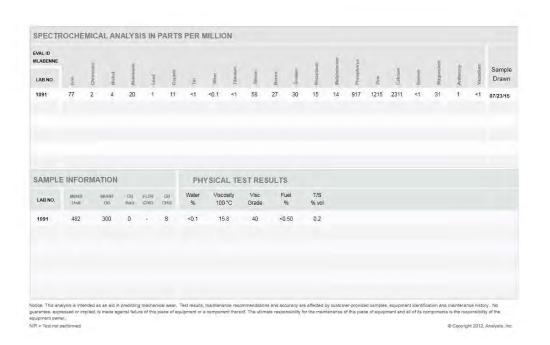
C-36 Oil Pan – Metallic Flakes and Heavy Particulate Found Under Turbo Return Area



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Appendix D - Oil Scan Oil Analysis





Appendix E - Engine Measurement Specifications and Procedures

Page 1 of 1

CTM301 - 2.4L and 3.0L Diesel Engines Cylinder Head and Valves Specifications

inder Head and Valves Specific	cations	
m	Measurement	Specification
it Pump Clamp	Torque	50 N·m (37 lb-ft)
ow Plug	Torque	13 N-m (9 lb-ft)
ow Plug Wire Harness Nut	Torque	3.5 N·m (31.lb-in.)
linder Head Cap Screw/Glow Plug Wire mess	Torque	28 N•m (21 lb-ft)
ake Valve	Recess in Cylinder Head	0.72—1.48 mm (0.028—0.058 in.)
haust Valve	Recess in Cylinder Head	0.72—1.48 mm (0.028—0.058 in)
ring Free Length 0 N (0 lb-force) [Free gth may vary slightly between valve rings.]	Height	46.2 mm (1.818 in.)
ring Compressed 166 N (37 lb-force)	Height	37.2 mm (1.46 in.)
ring Compressed 356 N (80 lb-force)	Height	27.0 mm († 06 in)
ake Valve Head	OD	36.87—37 13 mm (1.452—1.462 in.)
haust Valve Head	OD	33.87—34.13 mm (1.333—1.344 in.)
ako Valve Stem	OD	6 987—7 013 mm (0 2751—0 2761 in)
haust Valve Stem	00	6.974—7.000 mm (0.2746—0.2755 in.)
Ive Face	Maximum Runout (Intake and Exhaust)	0 038 mm (0:0015 in.)
lves	Face Angle	29.25° ± 0.25°
ial Cylinder Head Cap Screw (4-cylinder)	Torque	110 N·m (81 ft-lb)
al Cylinder Head Cap Screws No 1 - No 8 cylinder)	Torque	70 N·m (52 ft-lb) plus 150° +10/-0
ral Cylinder Head Cap Screws No.9 – 10 (4-cylinder)	Torque	70N·m (52 ff-lb) plus 120" +10"/-0"
tial Cylinder Head Cap Screw (5-cylinder)	Torque	110 N*m (81 ft-lb)
nal Cylinder Head Cap Screws No. 1 - 10 (5-cylinder)	Torque	70 N-m (52 ft-lb) plus 150" +10"/-0"
nal Cylinder Head Cap Screws No 11 12 (5-cylinder)	Torque	70N+m (52 ft-lb) plus 120° + 10°/-0°
it Pump Clamp	Torque	50 N-m (37 lb-ft)
p of valve spring retainer to cylinder head	Height	37.0 mm (1 46 in) minimum
ocker Arm Capscrew	Torque	40 N m (30 lb-ft)

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CTM301 - 2.4L and 3.0L Diesel Engines Camshaft, Balancer Shafts and Timing Gear Train Specifications

Camshaft, Balancer Shafts and Timing Gear Train Specifications

Item	Measurement	Specification
Camshaft	End Play	0.08-0.23 mm (0.003-0.009 in.)
Balancer Shatt	End Play	0.080.38 mm (0.0030.015 in.)
Camshaft Journal	OD	55.872—55.898 mm (2.1997—2.2007 in.)
Camshaft Bore, Front No. 1(Ball Bearing)	ID	55.961—55.987 mm (2.2031—2.2042 in.)
Camshaft Bore, All Except No. 1	10	55,986—56,012 mm (2,2042—2,2052 in)
Camshaft Journal-to-Bushing, No. 1 Bore (With Bushing)	Oil Clearance	0.063—0.115 mm (0.0025—0.0045 in.)
Camshaft Intake Lobe	Height	7 05-7 31 mm (0 278-0 288 in)
Camshaft Exhaust Lobe	Height	6.89—7 15 mm (0.271—0.281 in.)
Fuel Supply Pump Camshaft Lobe	Diameter	42.67—42.93 mm (1.68—1.69 in)
Camshaft Follower	OD	31.61—31.64 mm (1.245—1.246 in.)
Camshaft Follower Bore in Block	ID	31 70—31 75 mm (1.248—1.250 in.)
Camshaft Follower-to-Bore	Clearance	0 06—0 13 mm (0 002—0 005 in.)
Balancer Shaft Bushing (New)	ID	30 038—30 104 mm (1 1826—1 1852 in.)
Balancer Shaft Journal	OD	29.987—30.013 mm (1.1806—1.1816 in.)
Balancer Shaft Journal-to-Bushing	Oil Clearance	0.025—0.117 mm (0.0009—0.0046 in.)
Cylinder Block Bore for Balancer Shaft Bushing	(D	33.500—33.526 mm (1.3189—1.3199 in.)
Balancer Shaft Thrust Plate (New)	End Play	Not to Exceed 0.45 mm (0.02 in.)

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CTM301 - 2.4L and 3.0L Diesel Engines Cylinder Block, Liners, Pistons, and Rods Specifications

Cylinder Block, Liners, Pistons, and Rods Specifications

item	Measurement	Specification
Piston Ring-to-Groove Clearance—New Piston Ring (First Compression Ring Groove)	Maximum Clearance	0.12 mm (0.005 in.)
Piston Ring-to-Groove Clearance—New Piston Ring (Second Compression Ring Groove)	Maximum Clearance	0.098 mm (0.004 in.)
Piston Ring-to-Groove Clearance—New Piston Ring (Third Oil Control Ring Groove Standard Ring)	Maximum Clearance	0.09 mm (0.004 in.)
Piston Pin Bore	ID	30.003—30.009 mm (1.1812—1.1815 in.)
Piston Skirt (Measurement Taken at Bottom of Skirt 12 mm (0.5 in.) from Bottom of Piston)	Diameter	85.876—85.908 mm (3.381—3.382 in.)
Piston — Turbocharged Engines	Height	53,415—53,465 mm (2 103—2 105 in.)
Cylinder Bore	ID	85.987—86.013 mm (3.385—3.386 in.)
Piston-to-Cylinder Bore Clearance (Measured at Bottom of Piston Skirt)	Clearance	0.079—0.137 mm (0.003—0.005 in.)
Crankshaft Journal	OD	59.987—60.013 mm (2.361—2.363 in)
Assembled Rod Bearing	ID	60.030—60.073 mm (2.363—2.365 in.)
Connecting Rod Bearing-to-Journal Minimum	Clearance	0.017 mm (0.001in.)
Maximum	Clearance	0.086 mm (0.003 in.)
Connecting Rod Bore (Without Bearing Inserts)	ID	63.437—63.463 mm (2.498—2.499 in)
Piston Pin	OD	29.994—30 000 mm (1 1809—1 1811 in.)
	OD Wear Limit	29.980 mm (1 1808 in.)
Piston Pin	Length	67.75—68.00 mm (2.667—2.677 in.)
Rod Bearing Bore-to-Piston Pin Bushing Bore (Center-to-Center)	Measurement	170 mm (6.69 in.)
Plug (Oil Gallery)	Torque	15 N m (11 lb-ft)
Camshaft Follower Bore in Block	ID	21 428—21 454 mm (0.8436—0.8446 in.)
Camshaft Follower (New)	OD	21 392—21 404 mm (0.8422—0.8427 in.)
Connecting Rod Cap Screws	Initial Torque	35 N m (18 lb-ft)
Connecting Rod Cap Screws	Torque-Turn	1/4 Turn (90—100°) After Initial Torque

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CTM301 - 2.4L and 3.0L Diesel Engines Crankshaft, Main Bearings, and Flywheel Specifications

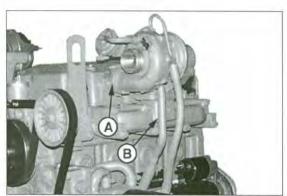
Crankshaft, Main Bearings, and Flywheel Specifications

Item	Measurement	Specification
Damper	Maximum Radial Runout (Concentricity)	1.00 mm (0.040 in)
Damper Pulley Outer Ring	Wobble (Maximum)	1.50 mm (0.060 in.)
Damper Pulley Inner Ring	Wobble (Maximum)	0.5 mm (0.020 in.)
Starter Motor Mounting Cap Screws	Torque	80 N m (59 lb-ft)
Initial Pulley Mounting Cap Screw	Torque	100 N m (74 lb-ft)
Final Pulley Mounting Cap Screw	Torque Turn	50 N m + 90" (37 lb-ft + 9
Crankshaft.	End Play	0.089—0.396 mm (0.004—0.016 in.)
Flywheel Face Flatness	Maximum Variation	0.23 mm (0.009 in.)
	Maximum Variation per 25 mm (1.0 in) of Travel	0.013 mm (0.0005 in.)
Flywheel Bearing Bore Concentricity	Maximum Variation	0.127 mm (0.005 in.)
Rear Oil Seal Housing Cap Screws	Torque	17 N m (13 lb-ft)
Crankshaft Main Bearing Cap Screws	Torque	80 N m (59 lb-ft)
Crankshaft Main Bearing-to-Journal	Oil Clearance	0.021—0.090 mm (0.0008—0.0035 in.)
Main Bearing Cap Screws	Torque	80 N m (59 lb-ft)
Crankshaft Main Bearing	(D)	75.034—75.077 mm (2.9541—2.9558 in.)
Crankshaft Main Journal	OD	74.987—75.013 mm (2.9522—2.9533 in.)
Crankshaft Rod Journal	OD	59 987—60.013 mm (2.36170—2.3627 in.)
Crankshaft Main or Rod Journal	Maximum Taper	0.010 mm (0.0004 in.)
Crankshaff Main or Rod Journal	Maximum Out-of-Round	0.008 mm (0.0003 in.)
Crankshaft Main Thrust Bearing Journal Width	Width	31 302—31.378 mm (1.2340—1.2350 in.)
Crankshaft Main Thrust Washer	Overall Thickness	2.95—3.05 mm (0.120—0.116 in.)
Crankshaft Main Bearing Bore (Without Bearings)	ID .	79.892—79.918 mm (3.1454—3.1464 in.)
Crankshaft Main Bearing Cap Screws	Torque	80 N'm (59 lb-ft)
Crankshaft	End Play	0.089—.396 mm (0.004—0.016 in.)
Initial Flywheel Housing Cap Screws	Torque	35 N m (26 lb-ft)
Final Flywheel Housing Cap Screws	Torque	140 N m (105 lb-ft)
Initial Flywheel Mounting Cap Screws	Torque	30 N m (20 lb-ft)
Final Flywheel Mounting Cap Screws	Torque	110 N'm (80 lb-ft)
Balancer Shaft Weight Cap Screws	Torque	16.5 N·m (12 lb-ft)

RG41183,000005E-19-20070109

CTM101019 - PowerTech™ E 2.4L and 3.0L Diesel Engines Turbocharger Oil Seal - Leak Check

Turbocharger Oil Seal — Leak Check



RG12656-UN: Turbocharger Oil Seal Leak Test

LEGEND

A - Inlet Hose B - Oil Return Line

Seals are used on both sides of the turbocharger rotor assembly. The seals are used to prevent exhaust gasses and air from entering the turbocharger housing. Oil leakage past the seals is uncommon but can occur.

A restricted or damaged turbocharger oil return line can cause the housing to pressurize, causing oil to leak by the seals. Additionally, intake or exhaust restrictions can cause a vacuum between the compressor and turbocharger housing, causing oil to leak by the seals.

- 1 Remove exhaust pipe (shown removed) and inlet hose (A)
- 2. Inspect the turbine casing and inlet hose for evidence of oil leakage.

If oil leakage is present, perform the following:

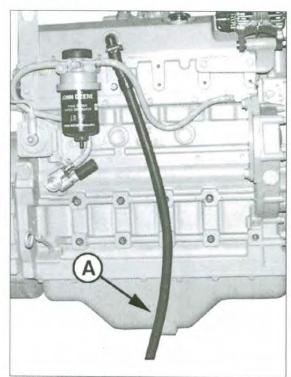
- O Inspect turbocharger oil return line (B) for kinks or damage. Replace if necessary.
 O Check the air intake filter, hoses, and inlet hose for restrictions.
 O Check the exhaust system for restrictions to include position of exhaust outlet.

- 3 Perform necessary repairs and repeat test.

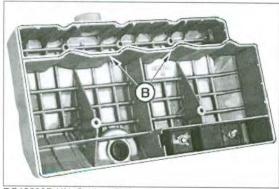
MK41968,000005E-19-20091217

CTM101019 - PowerTech™ E 2.4L and 3.0L Diesel Engines Crankcase Pressure Blow-By Test

Crankcase Pressure Blow-By Test



RG12659-UN: Blow-By Check



RG12530B-UN: Sealant Path

LEGEND.

- A Breather Tube B Sealant Path

Excessive blow-by coming out of the crankcase breather tube (A) indicates that either the turbocharger (if equipped) seals are faulty or the piston rings and cylinder bores are not adequately sealing off the combustion chamber. This is a comparative check that requires some experience to determine when blow-by is excessive.

Run engine at high idle and check crankcase breather tube. Look for significant fumes and/or dripping oil coming out of the breather tube at fast idle, with no

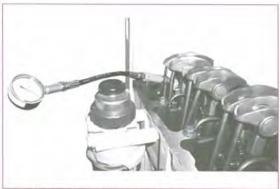
If excessive blow-by is observed, perform the following to determine if the turbocharger (if equipped) is causing the blow-by

- 1 Remove the turbocharger oil drain line where it connects to the engine block and run line into a bucket.
- 2 Run engine at high idle, slightly loaded, and determine if boost pressure is forcing oil through the drain line. Check crankcase breather tube to determine if blow-by has decreased
- 3 If it appears that boost pressure is forcing oil through the drain line, and/or blow-by decreases with the drain line disconnected from block, replace the turbocharger, and retest.
- 4 Remove rocker arm cover and inspect sealant path (B) for areas showing possible blow-by. Clean ssurface and apply sealant as shown and and reinstall. Allow sealant to completely cure. Run engine at high idle and check crankcase breather tube.

MK41968,0000054-19-20100415

CTM101019 - PowerTech™ E 2.4L and 3.0L Diesel Engines Mechanical Compression Test

Mechanical Compression Test



RG13030-UN: Engine Compression Test

IMPORTANT:

Compression pressures are affected by the cranking speed of the engine. Before beginning test, ensure that batteries are fully charged.

- Start engine and run at rated speed until it warms up to normal operating temperature. (From a cold start, operate engine 10—15 minutes at slow idle.)
- 2. Shut off engine and remove the rocker arm cover. See Rocker Arm Cover Installation and Removal in Group 20.
- 3. Shut off fuel supply and remove glow plugs. See Glow Plugs Removal in Section 20.
- Install JDG1687 into glow plug bore in the cylinder head and tighten to specification. Attach 45° quick disconnect fitting to compression adapter and install compression gauge to adapter. Do not tighten adapter to more than glow plug torque specification.

Item	Measurement	Specification
Glow Plug	Torque	13 N m (10 lb-ft)

5. Set rocker arm cover on top of cylinder head to reduce oil spray from push rods.

Compression Test

- 1. Push throttle lever to "STOP" position. Turn crankshaft for 10—15 seconds with starter motor (minimum cranking speed—150 rpm cold/200 rpm hot).
- 2. Compare readings from all cylinders. Compression pressure must be within specification.

Item	Measurement	Specification
Engine Compression Pressure Test	Engine Compression Pressure	2379—2792 kPa (24—28 bar) (345—405 psi)
	Maximum Difference between Cylinders	350 kPa (3.5 bar) (50 psi)

NOTE

Pressure given was taken at 183 m (600 ft) above sea level. A 3.6 percent reduction in gauge pressure will result for each additional 300 m (1000 ft) rise in altitude.

All cylinders within an engine should have approximately the same pressure. There should be less than 340 kPa (3.4 bar) (50 psi) difference between cylinders.

- 3. If pressure is much lower than shown, remove gauge and apply oil to ring area of piston through injection nozzle or glow plug bore. Do not use too much oil. Do not get oil on the valves.
- 4 Test compression pressure again.

If pressure is high, worn or stuck rings are indicated, replace piston rings or install new piston set as needed. See <u>Piston Rings</u> — <u>Installation</u>, <u>Piston and Connecting Rod</u> — <u>Reassemble</u> and <u>Piston and Connecting Rod</u> <u>Assembly</u> — <u>Installation</u> in Section 02, Group 030.

If pressure is low, valves could be worn or sticking. Recondition cylinder head as required. (See Cylinder Head — Thickness Check in Section 02, Group 020.)

5 Measure compression pressure in all remaining cylinders and compare readings. Recondition cylinders and valves as required.

IMPORTANT:

When testing is completed, use a clean lint free rag to clean all oil from intake manifold ports.

MK41968,00000A8-19-20100601

CTM301 - 2.4L and 3.0L Diesel Engines **Turbocharger Inspection**

Turbocharger Inspection

The following inspection procedure is recommended for systematic failure analysis of a suspected failed turbocharger. This procedure will help to identify when a turbocharger has failed, and why it has failed so the primary cause of the failure can be corrected.

Proper diagnosis of a non-failed turbocharger is important for two reasons. First, identification of a non-failed turbocharger will lead to further investigation and repair of the cause of a performance complaint.

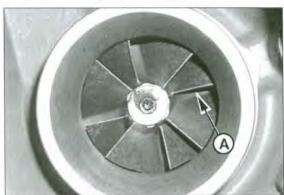
Second, proper diagnosis eliminates the unnecessary expense incurred when a non-failed turbocharger is replaced.

The recommended inspection steps, which are explained in detail on following pages, are:

- Compressor Housing Inlet and Compressor Wheel
 Compressor Housing Outlet.
 Turbine Housing Inlet.
 Turbine Housing Outlet and Turbine Wheel
 External Center Housing and Joints.
 Perform Axial End Play Test

To enhance the turbocharger inspection, an inspection sheet (Form No. DF-2280 available from Distribution Service Center—English only) can be used that lists the inspection steps in the proper order and shows potential failure modes for each step. Check off each step as you complete the inspection and record any details or problems obtained during inspection. Retain this with the work order for future reference.

Compressor Housing Inlet and Compressor Wheel



RG12517-UN: Checking Inlet and Compressor Wheel

A - Compressor Wheel

1 Check compressor inlet and compressor wheel (A) for foreign object damage

Foreign object damage may be extensive or minor. In either case, the source of the foreign object must be found and corrected to eliminate further damage.

2 Mark findings on your checklist and continue the inspection

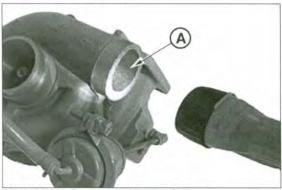
You will need a good light source for this check.



RG12518-UN: Checking Compressor Inlet

Check compressor inlet for wheel rub on the housing (arrow). Look very closely for any score marks on the housing itself and check the tips of the compressor wheel blades for damage.

Compressor Housing Outlet

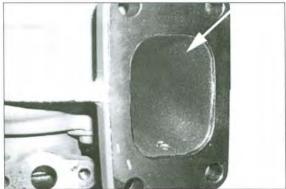


RG12519-UN: Compressor Housing Outlet

LEGEND

- A Compressor Housing Outlet
- 1. Check compressor housing outlet (A). The outlet should be clean and free of dirt or oil.
- 2. Mark it on your checklist if dirt or oil is found and continue the inspection.

Turbine Housing Inlet

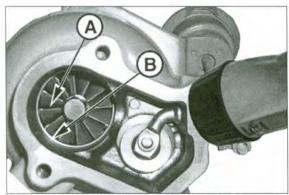


RG12523-UN: Checking Turbine Housing Inlet

Check the turbine housing inlet (arrow) for oil in housing, excessive carbon deposit

If the inlet is wet with oil, or has excessive carbon deposits, an engine problem is likely.

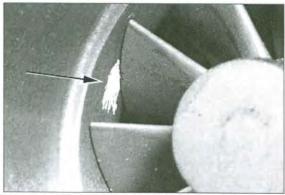
Turbine Housing Outlet and Turbine Wheel



RG12521-UN: Checking Turbine Wheel and Outlet

LEGEND

- A Blades B Turbine Housing Outlet
- 1 Use a flashlight to look up inside the turbine housing outlet (A) and check blades (B) for foreign object damage.



RG12524-UN: Checking Turbine Wheel Blades

Inspect the wheel blades and housing for evidence of wheel rub (arrow). Wheel rub can bend the tips of the blades with the housing showing wear or damage.

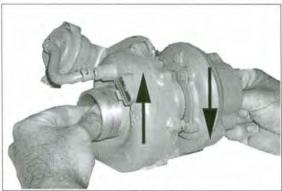


RG12525-UN: Checking Shaft Rotation and Clearance

Rotate the shaft, using both hands, to check rotation and clearance. The shaft should turn freely, however, there may be a slight amount of drag.

4. IMPORTANT:

Use only moderate hand force (3-4 pounds) on each end of shaft.



RG12526-UN: Checking for Contact of Compressor and Turbine Wheels

Next, pull up on the compressor end of the shaft and press down on the turbine end while rotating shaft. Neither the compressor wheel nor the turbine wheel should contact the housing at any point.

NOTE

There will be some "play" because the bearings inside the center housing are free floating.

External Center Housing and Joints



RG12520-UN: Checking Center Housing

Visually check the outside of the center housing, all connections to the compressor, and turbine housing for oil.

NOTE

If oil is present, make sure it is not coming from a leak at the oil supply or return line.

IMPORTANT:

Before you finalize your conclusion that the turbocharger has not failed, it is strongly recommended that the following procedures of checking radial bearing clearance and axial bearing endplay with a dial indicator be performed. These procedures are not required if a failure mode has already been identified.

Perform Axial Bearing End Play Test



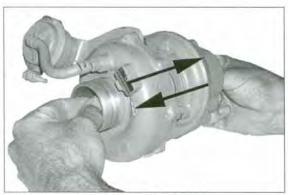
RG12527-UN: Checking Axial Bearing End Play

This test will give an indication of the condition of the thrust bearing within the center housing and rotating assembly

- 1. Mount magnetic base dial indicator so that indicator tip rests on flat surface on turbine end of shaft. Preload indicator tip and zero dial on indicator
- 2 Move shaft axially back and forth by hand
- 3 Observe and record total dial indicator movement.

Item	Measurement	Specification	
Turbocharger Shaft	Axial Bearing End Play	0.064—0.114 mm (0.0025—0.0045 in.)	

If bearing end play is not within specification, install a replacement turbocharger



RG12528-UN: Checking Shaft End Play

Next, check shaft endplay by moving the shaft back and forth (arrows) while rotating. There will be some endplay but not to the extent that the wheels contact the housings.

NOTE

These diagnostic procedures will allow you to determine the condition of the turbocharger. If the turbocharger has failed, analysis of your inspection notes should direct you to the specific areas of the engine to correct the problems causing the turbocharger failure. It is not unusual to find that a turbocharger has not failed. If your turbocharger passes all the inspections, the problem lies somewhere

Appendix F - Replacement Parts and Receipt



hudsonrivertractorcompany.com

The Hudson River Tractor Company, LLC. 3021 State Highway 5s P O Box 368 Fultonville, NY 12072 p. 518-853-3405 f. 518-853-8697 Goshen, NY p. 845-294-2500

Chatham, NY p. 518-392-2505

Clifton Park, NY p. 518-877-5059



Schaghticoke, NY p. 518-692-2676

Invoice To Account No.: 54971 Deliver To Account No.: 54971

THE RESEARCH FOUNDATION OF SUNY COBLESKILL WARNER HALL 206 192 ALBANY AVE COBLESKILL NY 12043

Home Phone:

THE RESEARCH FOUNDATION OF SUNY COBLESKILL WARNER HALL 206 192 ALBANY AVE COBLESKILL NY 12043

Cell Phone:

PARTS INVOICE

Invoice No:	237208
Date:	7/30/2015
Page:	1.of 2
Payment Type:	Credit Card

Supplied Quantity	Back Order Quantity	Part Number	Part Description		List Price	Net Price	Extended Price	Tax
6.00	0.00	19M8986	SCREW	E386-2	2.78	2.78	\$16.68	N
2.00	0.00	21M7536	Screw		0.70	0.70	\$1.40	N
6.00	0.00	40M1855	SnSNAP RING	C141	2.65	2.65	\$15.90	N
2.00	0.00	L157372	Screw	E455	1.00	1.00	\$2.00	N
5.00	0.00	R502454	Intake Valve		38.26	38.26	\$191.30	N
5.00	0.00	R502455	Exhaust Valve		38.26	38.26	\$191.30	N
10.00	0.00	R502503	Screw		2.05	2.05	\$20.50	N
2.00	0.00	R516692	SCREW		17.94	17.94	\$35.88	N
10.00	0.00	R516693	SCREW		8.56	8.56	\$85.60	N
2.00	0.00	R522728	Spring		5.45	5.45	\$10.90	N
1.00	0.00	RE44574	SEAL	B654	40.30	40.30	\$40.30	N
1.00	0.00	RE508202	FUEL FILTE	B308	29.13	29.13	\$29.13	N
1.00	0.00	RE519626	OIL FILTER	B713	10,69	10.69	\$10.69	N
2.00	0.00	RE520936	Piston Replacement Kit		65.52	65.52	\$131.04	N
5.00	0.00	RE520937	Bearing Kit		20.33	20.33	\$101.65	N
1.00	0.00	RE524593	Gasket Kit		155.00	155.00	\$155.00	٨
1.00	0.00	RE528707	Engine Cylinder Head Gasket		60.19	60.19	\$60.19	N
10.00	0.00	RE532712	Seal		4.45	4.45	\$44.50	N
3.00	0.00	RE543439	Piston Ring Kit		21.04	21.04	\$63.12	N
1.00	0.00	RE547148	GASKET KIT		122.82	122.82	\$122.82	N



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Goshen, NY p. 845-294-2500

Chatham, NY p. 518-392-2505





Schaghticoke, NY p. 518-692-2676

Invoice To	Account No.:	54971	Deliver To Account No.:	54971	PARTS INVOICE		ICE	
SUNY C WARNE 192 ALB	OBLESKILL R HALL 200 ANY AVE SKILL NY 1	3	THE RESEARCH FO SUNY COBLESKILL WARNER HALL 206 192 ALBANY AVE COBLESKILL NY 1.		I I	Date: Page:	7/30	7208 /2015 2 of 2 Card
Supplied Quantity	Back Order Quantity	Part Number	Part Description	Bin Loc	List Price	Net Price	Extended Price	Tax
1.00	0.00	3750	FREIGHT		18.70	18.70	\$18.70	N

		Credit Card Information	Parts:	\$1,329.90
Customer PO No:		Type: Credit Card	Misc:	\$18,70
Tax Exempt No:	ST-125 ON FILE	Auth No: v022337	Sales Tax:	\$0.00
Salesperson:	JIM FURMAN	Amount: \$1,348.60	Deposit:	\$0.00
			Total:	\$1,348.60





TERMS AND CONDITIONS

Terms net cash. All accounts not paid by the 10th of the month following purchase are subject to a Finance Charge at a monthly rate of 1,75%, which is an annual rate of 21%, applied to the previous balance without deducting current payments and/or credits.

All parts returned must be accompanied by this invoice and returned within 30 days. No returns of electrical parts. 20% restocking fee on all special order parts returned.

Received by:	Date:	Date:	7/30/2015

https://johndeere.internetsecure.com/OTCSubmit

7/30/2015

THE HUDSON RIVER TRACTOR CO FULT 3021 STATE HIGHWAY 5 S FULTONVILLE, NY - 12072

Merchant Number: 008013032829

- Transaction Approved -

Receipt #: 1462607475.53A2 Invoice #: 146260747553A2

Card Number: *********9898

Date: July 30, 2015 Card Type: VISA Input Type: KEYED Trans Type: Purchase Auth #: 022337

Total: \$1348.60

Signature X

I agree to pay above total amount according to card issuer agreement

Print Back